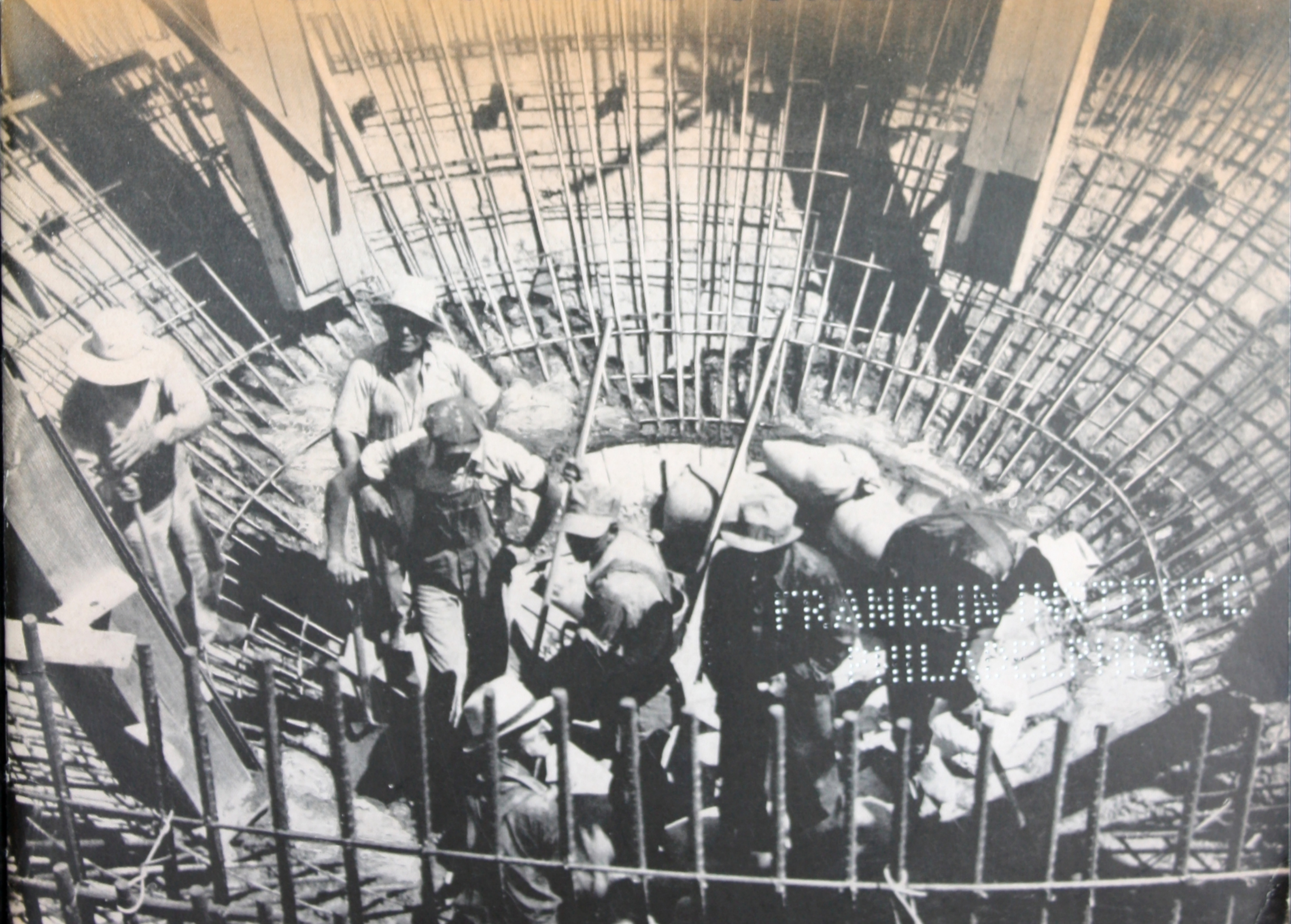
1314-7

Also Concrete

POZZOLITH

FOR MORE DURABLE AND ECONOMICAL CONCRETE



MASTER BUILDERS

MASTERBUILT FLOORS

Foreword

THROUGHOUT the world for many years concrete has played a most important part in construction. Yet authorities everywhere have recognized the need for improvement in concrete which would fortify it against the action of the elements—freezing and thawing, and other disintegrating influences.

The Research Laboratories of The Master Builders Company recently announced to the construction industry a new principle—CEMENT DISPERSION. This principle was discovered ten years ago and incorporated in Pozzolith. A decade was devoted to testing and proving the efficiency of this product in the laboratory and in the field.

The evidence of performance of Pozzolith has accumulated in an impressive and conclusive manner. This book sets forth some of this evidence on the "how" and "why" of Pozzolith. It shows representative installations and users.

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The application of the DISPERSION PRINCIPLE to cement increases the efficiency of all cement to which it is applied. This is a basic technologic advance in the cement field since it has long been recognized that only from 50% to 60% of the cementing value is utilized in concrete design because of incomplete hydration. [Anderegg & Hubbell A.S.T.M. 29 II 554 (1929)]. Through dispersion of the cement, important savings in *initial* costs, as well as *maintenance* costs are made for:

(1) OWNERS . . . by lowering first costs of construction and by reducing and deferring for many years the maintenance costs of their concrete structures.

(2) DESIGN ENGINEERS . . . by improving their control over the consistency, uniformity and quality of structures they plan, and by providing a means of designing quality concrete economically.

(3) CONTRACTORS . . . by reducing material costs and placing costs through increased workability, easy and economical placement, protection from segregation and bleeding, resulting in reduced patching and rubbing of the concrete.

Full technical data will be sent to those who desire more complete information.

WHAT IS POZZOLITH?

POZZOLITH is a cement dispersing agent combined with a pozzuolanic carrier in the form of a fine gray powder. It is added to the concrete mix at the mixer. By deflocculating the cement particles it greatly increases the effective surface area of the cement, increasing the plasticity of the mix, and reducing the excess water required for placing the concrete.

The use of Pozzolith in concrete results in important functional, as well as structural advantages, as follows:

1. Durability increased 50% or more
2. High Early Strength—20% or more Increase in Compressive Strength at all ages
3. Water Reduction—up to 20%
   Slump Increased 150% or more for given water ratio
4. Increased Water-tightness—20% or more reduction in Absorption and Permeability
5. Reduced Bleeding and Segregation
6. Reduced Heat with Minimum Cement Content

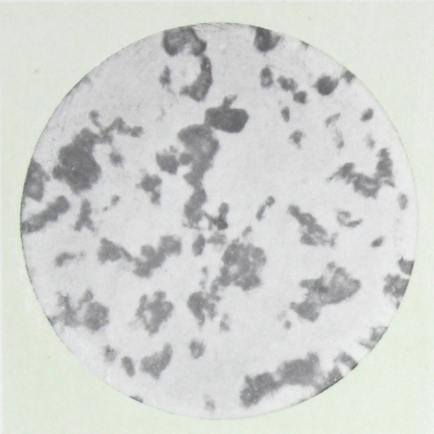
which means

1. Concrete of given strength at lower cost.

2. Stronger and more durable concrete at a given cost.

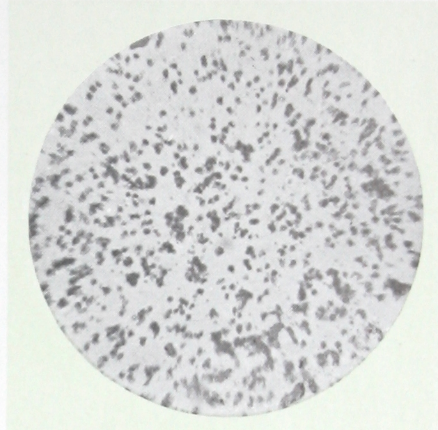
Pozzolith is made in two types—Standard and High Early. High Early Pozzolith provides all the advantages of Standard Pozzolith, *plus* high early strengths; i.e., normal 3 day strength in 1 day, normal 7 day strength in 3 days, normal 28 day strength in 7 days.

HOW POZZOLITH IMPROVES ALL CONCRETE



Plain cement in water showing flocculation. Magnified 300 times.

Cement in water with Pozzolith added, showing dispersion. Magnified 300 times.



Cement particles in their normal state in water tend to gather in bunches, i.e., flocculate. Water never reaches some particles and many are only partly hydrated. This reduces the effectiveness of the cement, entraps water within the clumps, requires an excess of water for placement and often results in bleeding and segregation.

With Pozzolith the dispersion principle operates to drive each particle apart, thus exposing all the cement particles to the vital hydrating action and consequently assuring increased efficiency.

CEMENT DISPERSION*

ONLY a part of the cementitious value of the cement, whether normal portland or high early, is utilized under usual construction conditions. Investigation shows that with 28 days curing only 50% of the cement hydrates. Even with 90 days curing only 60% of the cement hydrates. [Anderegg and Hubbell, A.S.T.M. 29 II 554 (1929)]

Since the reactions on which portland cement depends for its valuable properties are surface reactions, it is obvious that a dispersing agent in the mix permits utilization of the cement to the full extent. Cement Dispersion applied through Pozzolith increases the degree of hydration of the cement from 30% to 40% which is fully confirmed by the resulting increases in strength.

Dispersion also produces a "buttery" or "fatty" condition in the mix, which is directly due to the attractive forces between the greater surfaces. These attractive forces produce cohesiveness which in turn reduces the tendency of the mix to separate, that is toward segregation, and reduces or eliminates bleeding or water gain. Higher "water retentivity" in the mass is produced, which is important for proper concrete curing.

Water held in the clumps is released to become part of the fluid through which the particles move. Thus the mix is made more workable, and more important, *workable with less water content.*

*Master Builders' Research Laboratories Technical Papers Nos. 35 and 36, which deal in detail with the principle of dispersion of cement particles, will be sent you on request.

How these **IMPROVEMENTS** result in
GREATER DURABILITY—is shown pages 7 to 17
LOWER COSTS—is shown pages 18 to 21

MILWAUKEE FILTRATION PLANT

The City of Milwaukee's giant filtration plant in which Pozzolith was used, permitting a sharp reduction in water while increasing workability and creating a finished concrete of unusual density and water tightness.

J. P. SCHWADA, City Engineer, ALVORD, BURDICK & HOWSON, Consulting Engineers, Chicago, Ill., STEIN CONST. CO., KROENING ENGINEERING CORP., Contractors, Milwaukee, Wis.

Pozzolith Increases Durability . . .

By Reducing Water Up to 20%
By Increasing Workability 150%

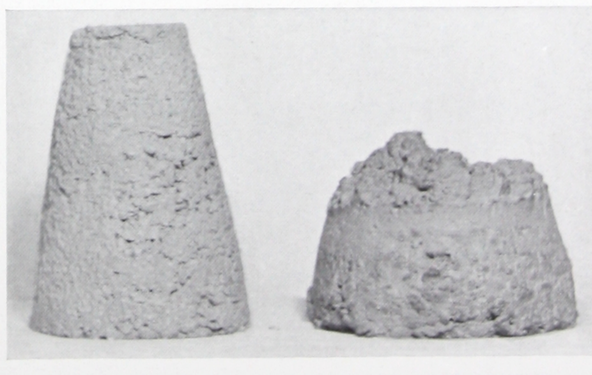
Pozzolith increased the workability of "Pump-crete", made placeability easier, on this Milwaukee job.

POZZOLITH PRODUCES GREATER WORKABILITY WITH LESS WATER

PLAIN MIX		POZZOLITH MIX
$6\frac{3}{4}$ gallons	W/C	$5\frac{5}{8}$ gallons
$1\frac{3}{4}$ inches	SLUMP	$2\frac{1}{2}$ inches

DISPERSION of the cement particles through the addition of Pozzolith to regular portland cement increases the mobility or ease of flow, since water held in clumps of the flocculated cement is released to become part of the fluid medium through which the particles move.

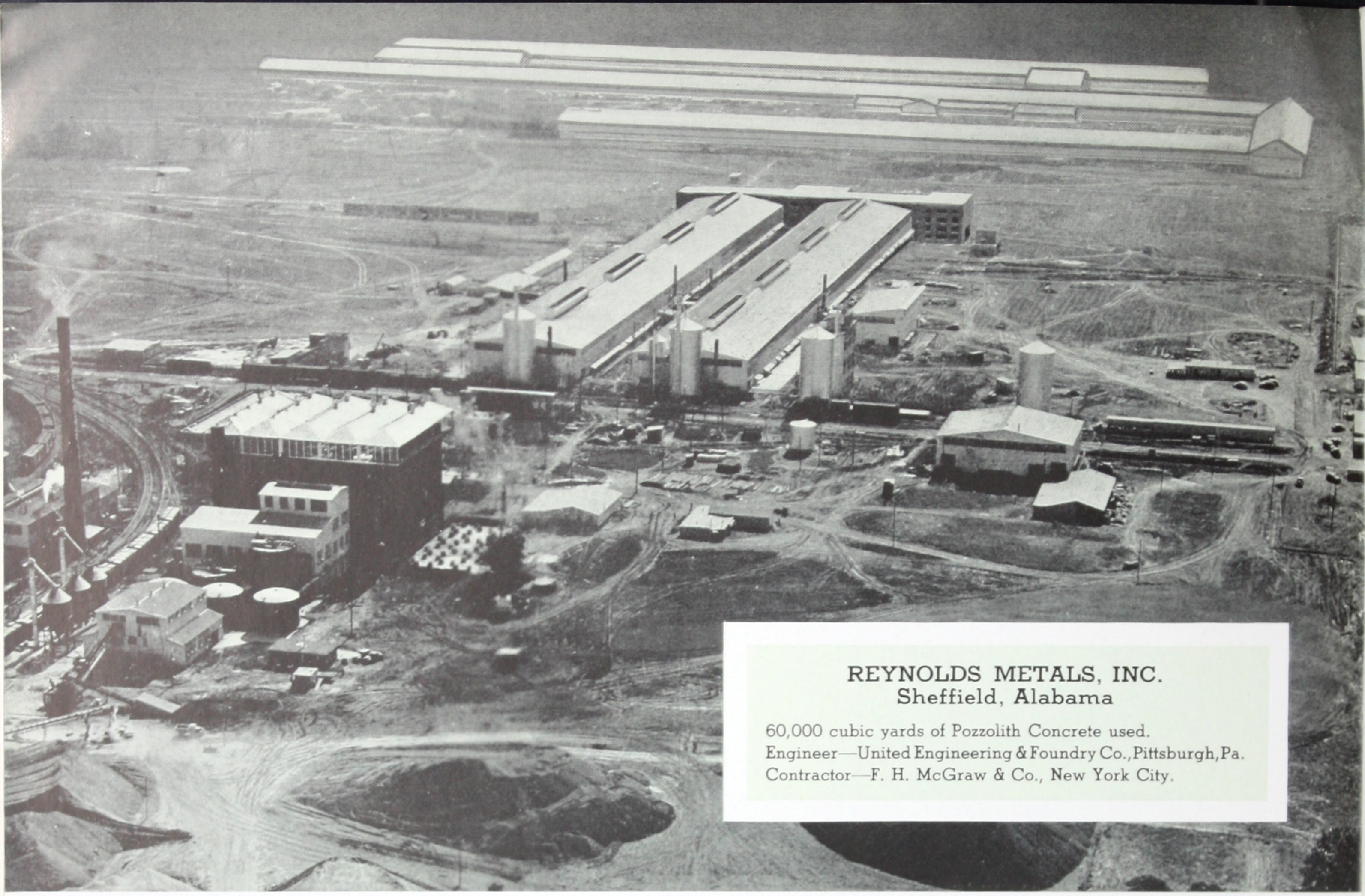
Consequently, for a required slump much less water is required. At equal "slump" the mobility of a Pozzolith Concrete mix is conspicuously greater than that of the corresponding Plain mix. This reduction in water-cement ratio greatly increases durability.



POZZOLITH PRODUCES GREATER SLUMP WITH SAME AMOUNT OF WATER

PLAIN MIX		POZZOLITH MIX
$6\frac{1}{2}$ gallons	W/C	$6\frac{1}{2}$ gallons
1 inch	SLUMP	5 inches

and POZZOLITH REDUCES INITIAL COSTS—See page 19



REYNOLDS METALS, INC.
Sheffield, Alabama

60,000 cubic yards of Pozzolith Concrete used.
Engineer—United Engineering & Foundry Co., Pittsburgh, Pa.
Contractor—F. H. McGraw & Co., New York City.

TAYLORCRAFT AVIATION CORP.
Alliance, Ohio

Architect—Albert Kahn, Inc., Detroit, Michigan.
General Contractor—F. H. Martin Construction Co., Detroit, Michigan.

"Having a very workable concrete, coupled with High Early Strength qualities, we were able to speed up construction, which permitted a more rapid re-use of our forms, shores, etc., and effected a savings in labor and material on the job."

F. H. MARTIN CONSTRUCTION CO.

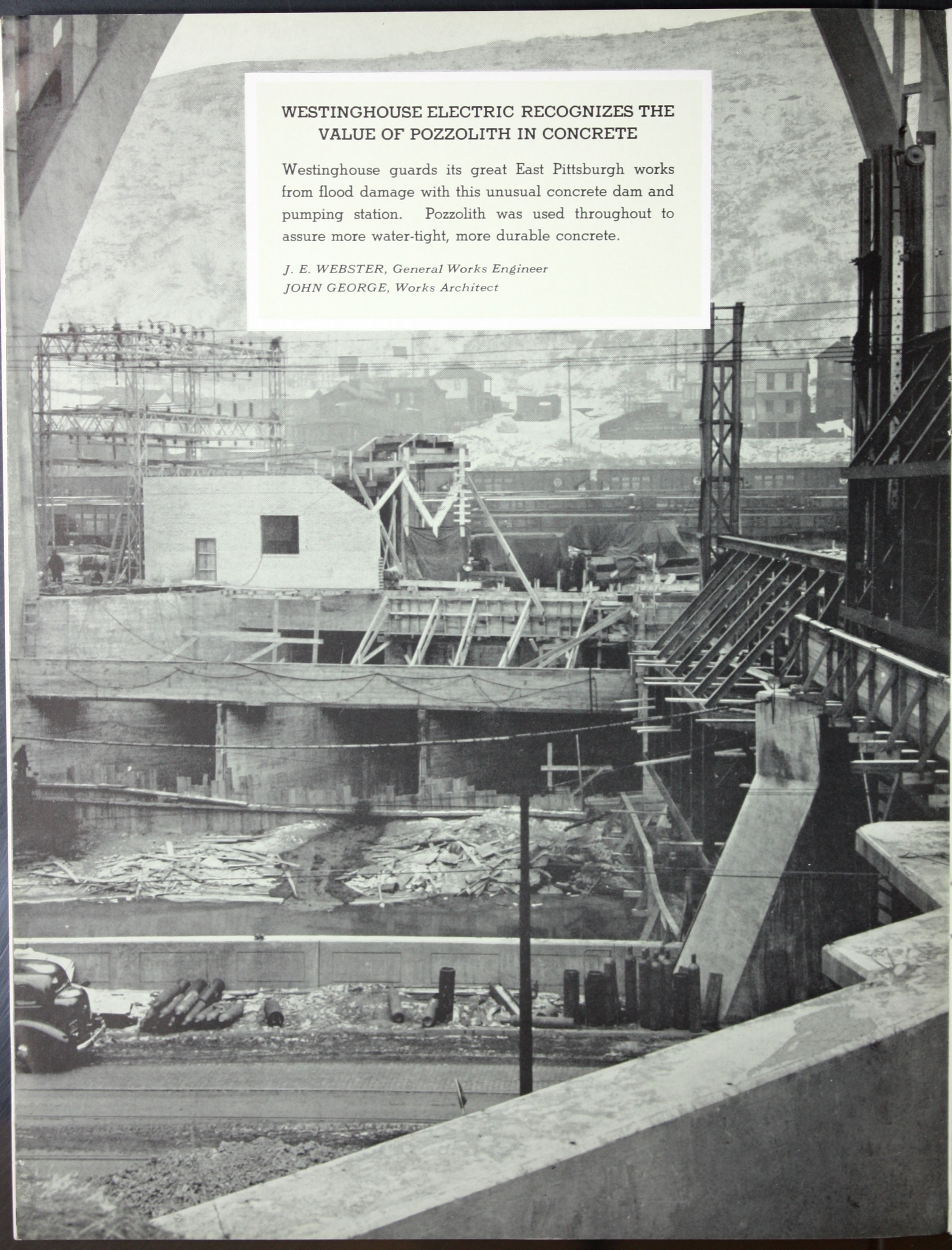
Pozzolith Increases Durability . . .

By Reducing Water Gain and Segregation

By the use of Pozzolith, concrete can be poured with minimum water gain, thus reducing segregation.

THE phenomenon which is called variously 'initial shrinkage', 'bleeding', 'water gain', or 'settling', is the displacement in the vertical direction of the solids downward and the water upward. As a direct consequence of the reduced water content and increased cohesiveness produced by Pozzolith, this action is reduced or eliminated, as are the formation of laitance and planes of weakness at the tops of pours.

and POZZOLITH REDUCES INITIAL COSTS—See page 19



WESTINGHOUSE ELECTRIC RECOGNIZES THE VALUE OF POZZOLITH IN CONCRETE

Westinghouse guards its great East Pittsburgh works from flood damage with this unusual concrete dam and pumping station. Pozzolith was used throughout to assure more water-tight, more durable concrete.

J. E. WEBSTER, General Works Engineer
JOHN GEORGE, Works Architect

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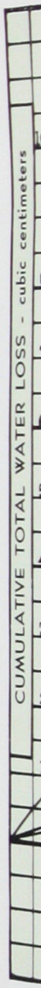

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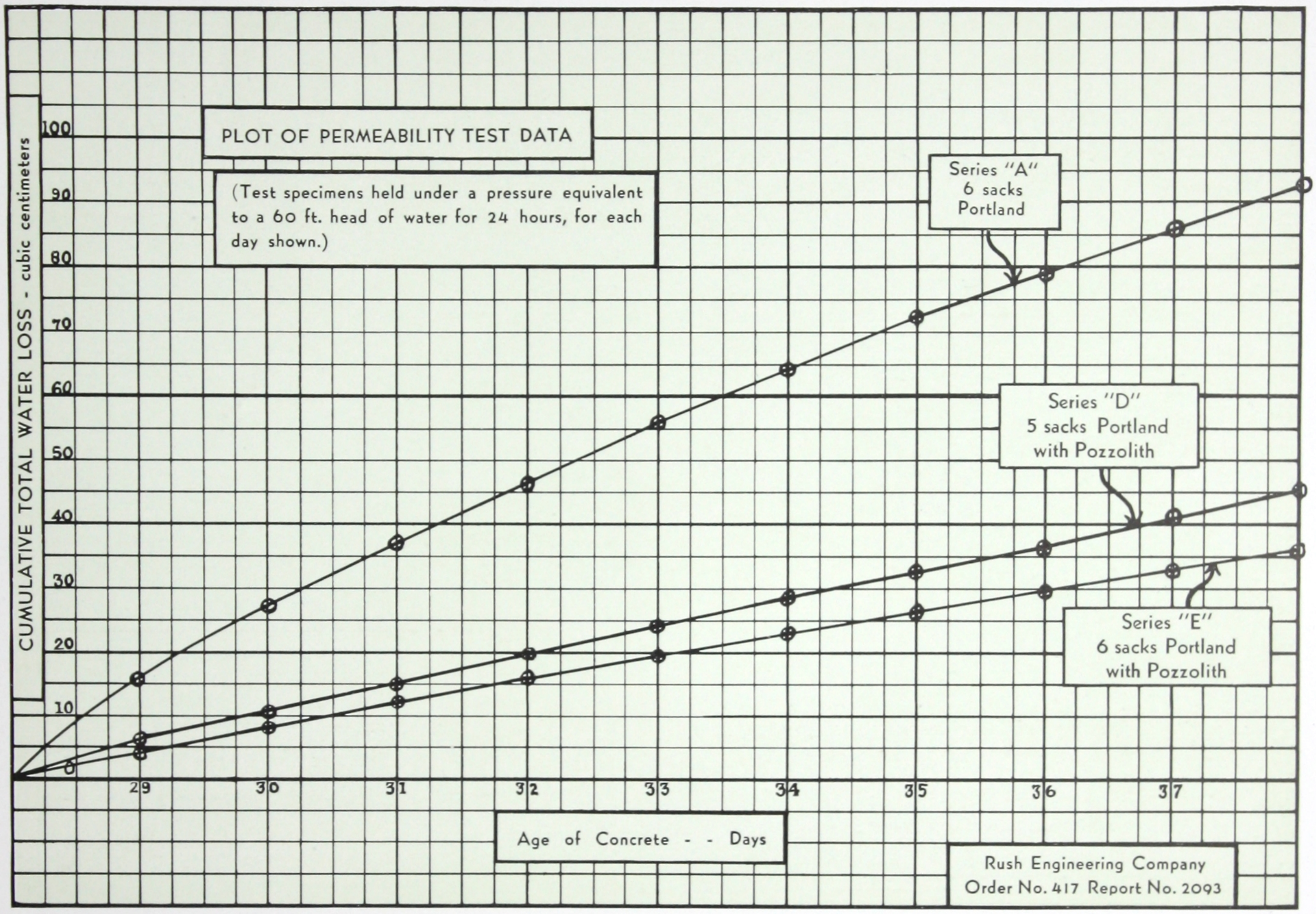
Pozzolith Increases Durability . . .

By Increasing Water-Tightness 40%



Report of Permeability tests of Plain and Pozzolith concrete by Rush Engineering Co., Chicago, Illinois. Tests included three types of concrete: (1) Plain "6-sack" concrete; (2) Pozzolith "6-sack" concrete; and (3) Pozzolith "5-sack" concrete.

By eliminating up to 33% of the excess water from the mix, Pozzolith directly attacks the big cause of leakage. Permeability and absorption are reduced. Note that mix "D" with same placeability as mix "A", and of substantially the same cost, is more water-tight, despite 94 lbs. more cement per yard in mix "A".

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Complete Rush Engineering Co. report sent on request.

OMAHA TESTING LABORATORIES
OMAHA, NEBRASKA
Nov. 9, 1940

Report of Special Tests made at the Sewage Disposal Plant, Omaha, Nebr., to show the effect of using Pozzolith as an admixture in concrete.

COMPRESSIVE STRENGTH

Cement per cu. yd.	Lbs. per Sq. In.	Age in Days	Absorption	Admixture
7 sk	4395	28		none
	4448	28		
		28	6.7	
7 sk	5590	28		
	5554	28		Pozzolith
		28	4.7	
6 sk	4873	28		
	4855	28		Pozzolith
		28	5.2	

and POZZOLITH REDUCES MAINTENANCE COSTS—See page 21

ALUMINUM COMPANY OF AMERICA FACTORY ADDITION
Edgewater, New Jersey

Excellent example of Pozzolith Concrete in Industrial Construction.

Chief Construction Engineer—J. W. Schreiber. Engineer—Alexander Crosett.

Contractor—Turner Construction Co., New York, New York. E. K. Abberley, Engineer. Mr. Richards, Job Supt.

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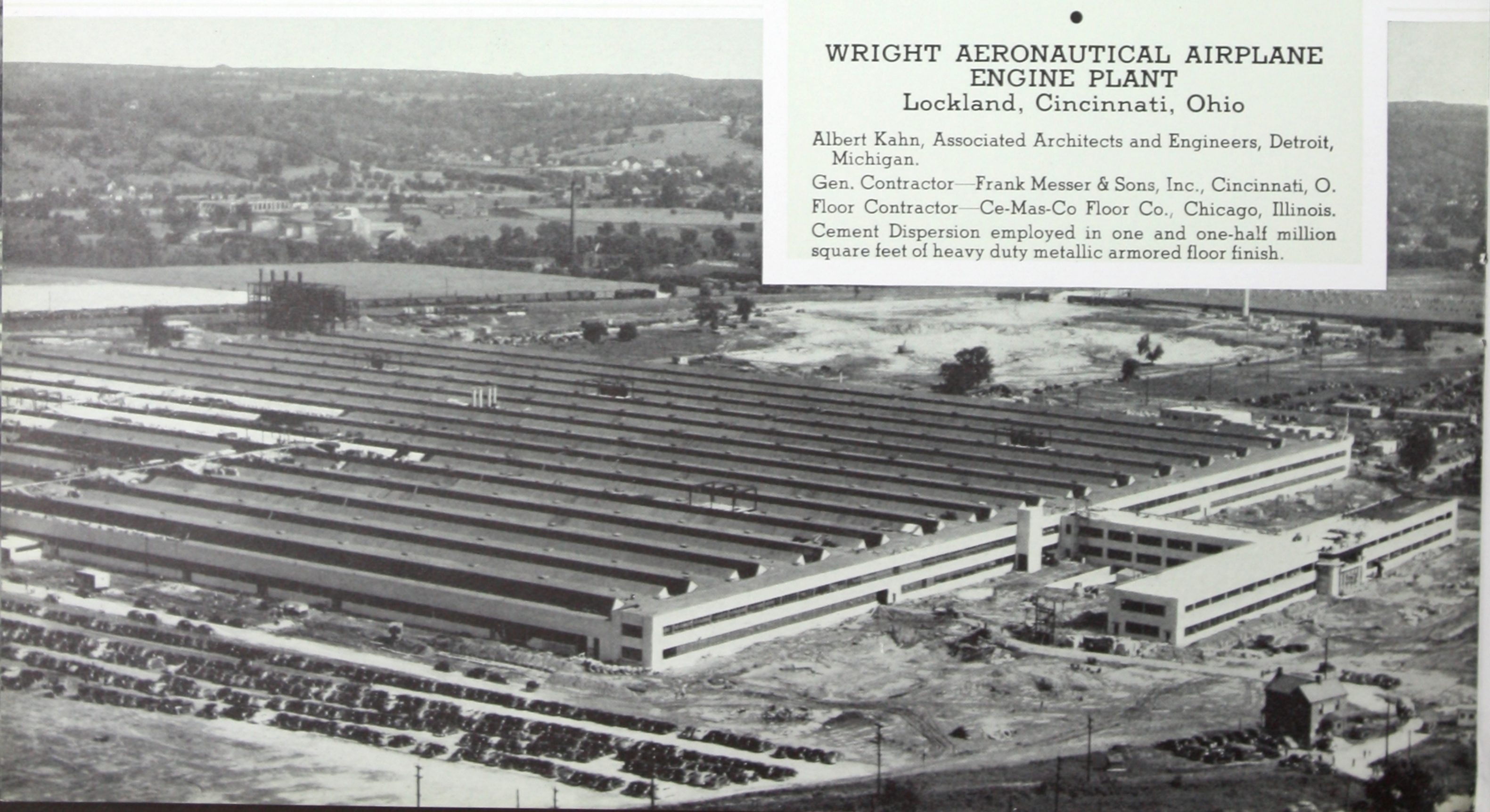
WRIGHT AERONAUTICAL AIRPLANE ENGINE PLANT
Lockland, Cincinnati, Ohio

Albert Kahn, Associated Architects and Engineers, Detroit, Michigan.

Gen. Contractor—Frank Messer & Sons, Inc., Cincinnati, O.

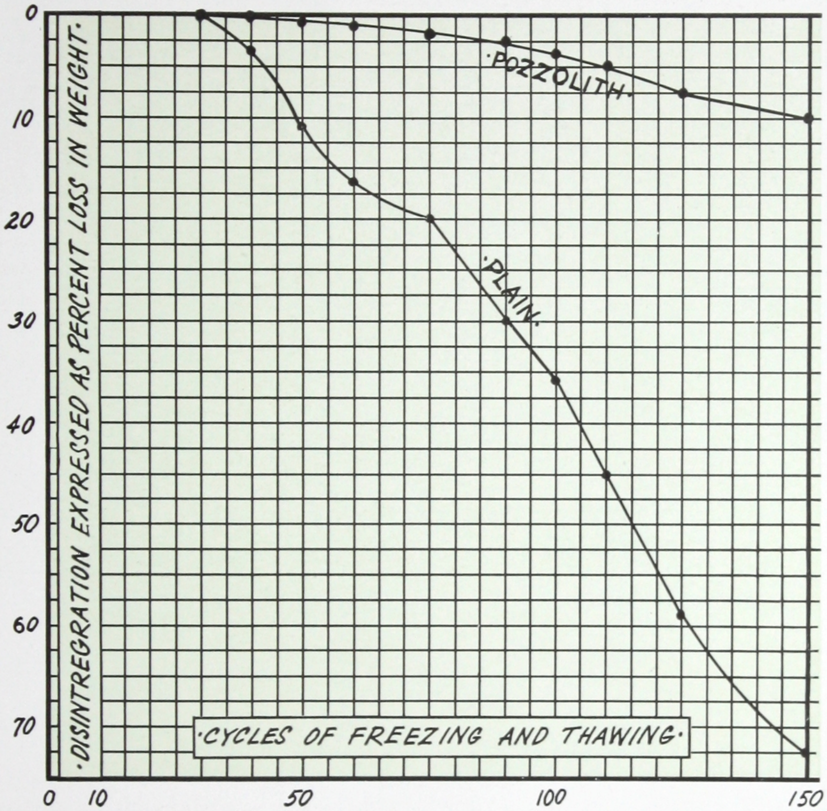
Floor Contractor—Ce-Mas-Co Floor Co., Chicago, Illinois.

Cement Dispersion employed in one and one-half million square feet of heavy duty metallic armored floor finish.



Pozzolith Increases Durability . . .

By Increasing Resistance to Freezing and Thawing 40% or More . . By Increasing Resistance to Corrosion



The above graph and photographs from report of tests made at a leading University show increase in durability of Pozzolith concrete from 100% to 200% over that of corresponding plain mix. (*Detailed report sent on request.*)

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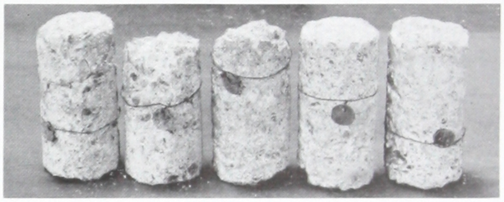
The Durability of Concrete is measured by its resistance to freezing and thawing. Freezing and thawing tests made in the laboratories of leading universities and institutions prove conclusively the far greater durability of Pozzolith Concrete.

Many concrete structures are exposed to sea water, alkali soil, corrosive solutions formed from acid impurities in the air, from various soluble compounds in nature or from industrial processes, all highly destructive agencies. Pozzolith increases very substantially the life of concrete subject to these destructive agents by making stronger, more water-tight concrete, plus reduced solubility due to pozzuolanic action.

PROOF OF DURABILITY

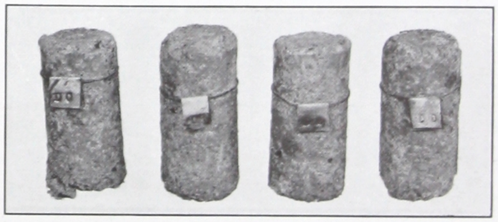
These specimens were made of identical mixes. Dispersion of cement in Pozzolith concrete specimens permitted 15% less water (1.7 gallons less per sack of cement).



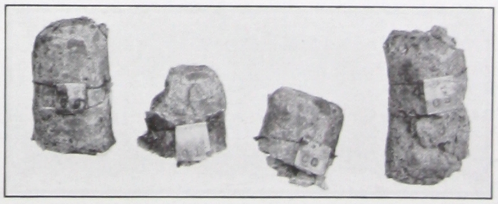
Pozzolith concrete after 150 cycles of freezing and thawing lost only 10% by weight.

Plain concrete after 150 cycles of freezing and thawing lost 73% by weight.

TWO YEARS EXPOSURE TO STRONG SULPHATE CORROSION



Specimens of Pozzolith Concrete, at equal consistency and identical in mix with plain concrete in bottom picture, except for the addition of Pozzolith and reduction in water, after undergoing 2 years' exposure to 8% Magnesium Sulphate solution (renewed weekly). Only incipient disintegration has occurred.



The plain specimens after 2 years' exposure to 8% Magnesium Sulphate solution (renewed weekly). The disintegration is far advanced.

and POZZOLITH REDUCES MAINTENANCE COSTS—See page 21

POZZOLITH USED THROUGHOUT CONCRETE STACK 512 FEET HIGH FOR INTERNATIONAL NICKEL COMPANY

Built by

CUSTODIS CANADIAN CHIMNEY CO.

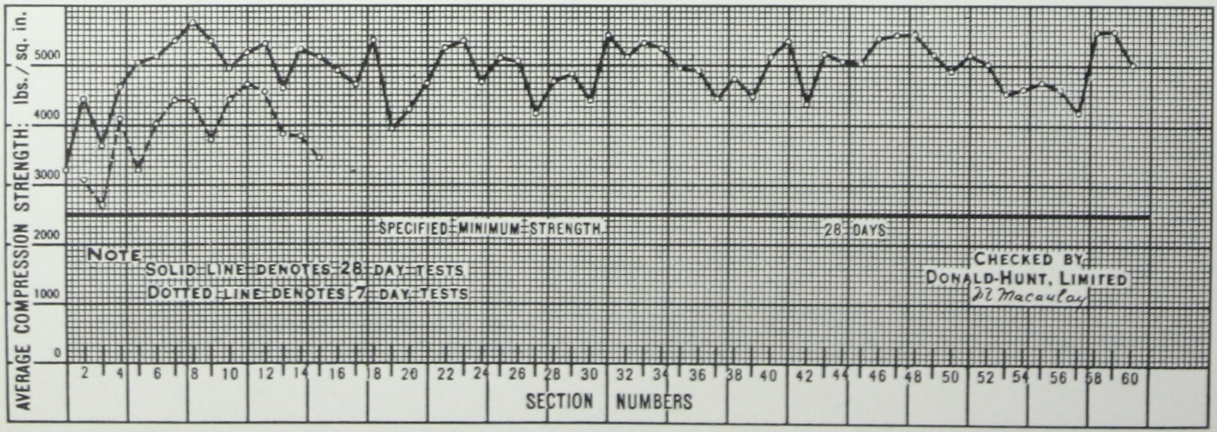
". . . for the 450 feet of shell (60 sections), it was assumed that the concrete would develop an ultimate compressive strength of 2,500 lbs. per sq. in.

". . . Pozzolith was added to each bag of cement . . . the average slump of concrete was about 3 inches."

Excerpt from Custodis Chimney Catalog.

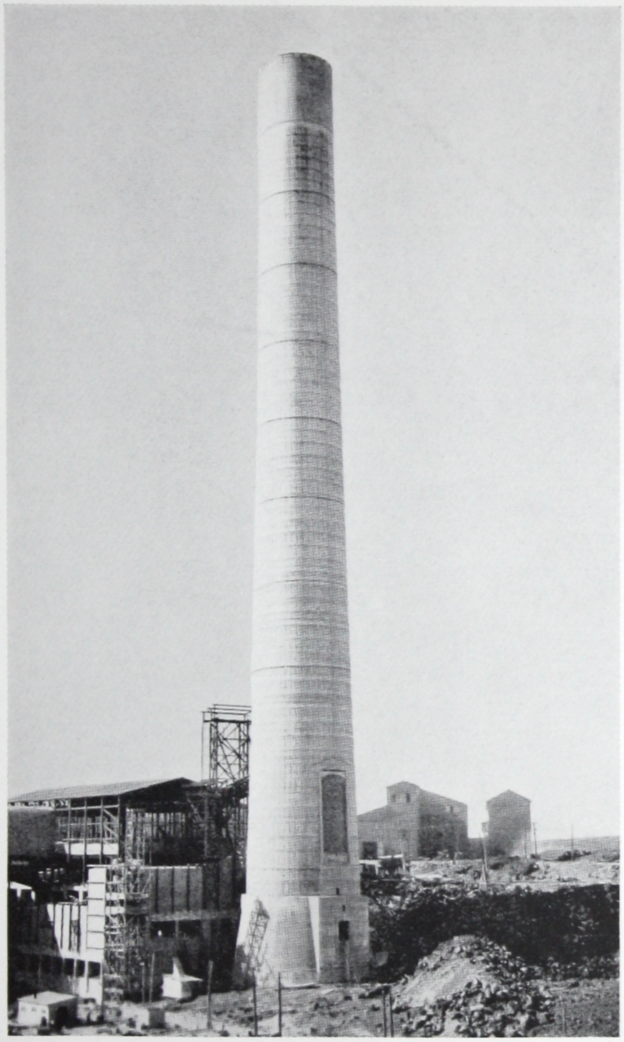
Note that strength of Pozzolith is approximately 5,000 lbs. per square inch—double that expected (see chart below).

Cylinder Tests by Donald-Hunt, Ltd., Montreal P. Q.



Observe the results of the test as indicated by the curves to the left.

Pozzolith Increases Durability . . .



International Nickel Company Stack, Copper Cliff, Ontario

By Increasing Strength 25%

STRENGTH of workable mixes is governed by the water-cement ratio law and the surface area available for hydration. Since Pozzolith reduces the water-cement ratio up to 20%, and by dispersing the cement particles makes greater surface area available, it automatically increases the strength by at least 20% over that of plain concrete of same design and slump. Field reports show this increase actually averages 25% or more.

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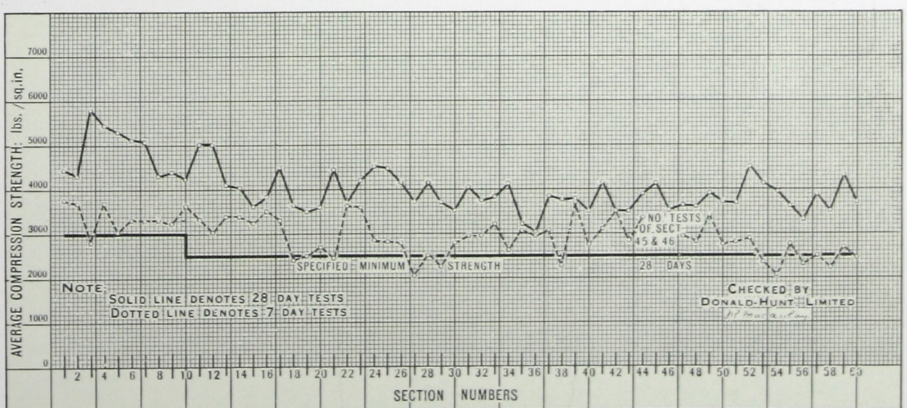
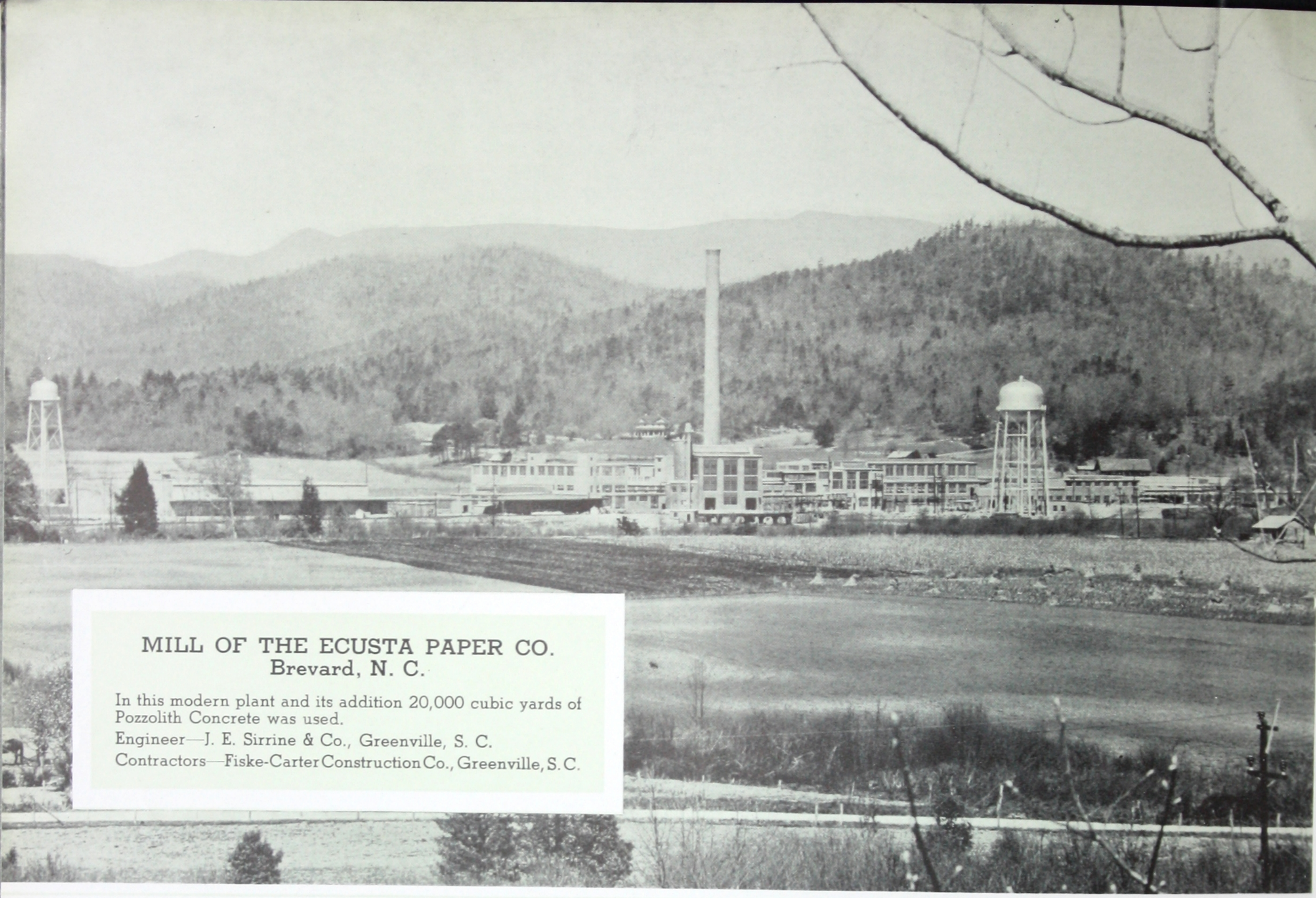
The above stack was built in the same year, 1936, by the same builder, Custodis Canadian Chimney Company, using the same mixes and methods, except for the use of Pozzolith in Port Colborne stack (opposite page). Slump of the concrete in both jobs was the same: averaging 3 inches. Note Strength of Pozzolith Concrete averages 25% higher.

Cylinder Tests by Donald-Hunt, Ltd., Montreal, P. Q. of Concrete on Copper Cliff Stack



Cylinder Tests by Donald-Hunt, Ltd., Montreal, P. Q.

and POZZOLITH REDUCES INITIAL COSTS—See page 18

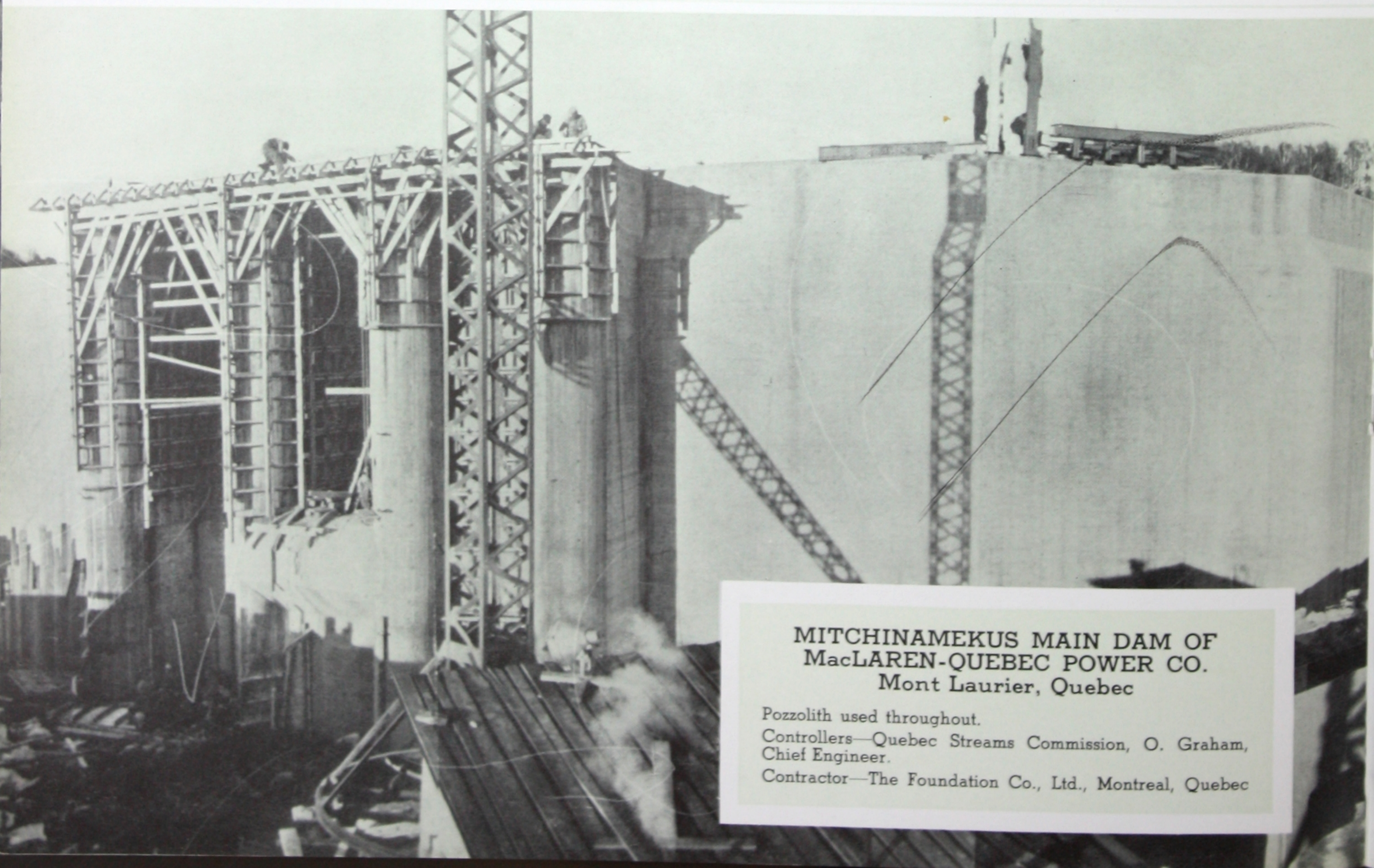


MILL OF THE ECUSTA PAPER CO.
Brevard, N. C.

In this modern plant and its addition 20,000 cubic yards of Pozzolith Concrete was used.

Engineer—J. E. Sirrine & Co., Greenville, S. C.

Contractors—Fiske-Carter Construction Co., Greenville, S. C.



MITCHINAMEKUS MAIN DAM OF MacLAREN-QUEBEC POWER CO.
Mont Laurier, Quebec

Pozzolith used throughout.

Controllers—Quebec Streams Commission, O. Graham, Chief Engineer.

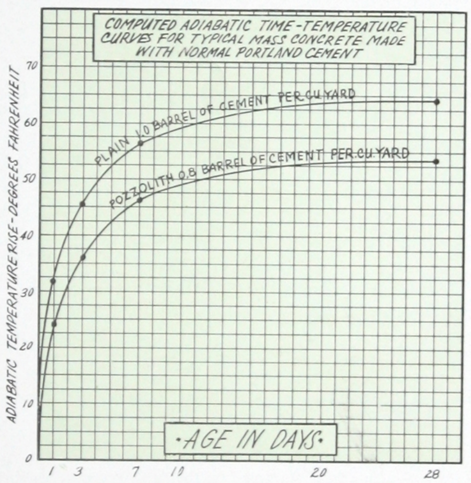
Contractor—The Foundation Co., Ltd., Montreal, Quebec

Pozzolith Increases Durability . . .

By Avoiding Excess Cement Content and Excess Heat

FLOCCULATION of cement particles normally makes the use of excess cement and water necessary to produce workability. The use of this excess cement paste results in increased heat evolution and increased volume change with their tendency to produce cracks.

TEMPERATURE CHART



Temperature rise (adiabatic) for two normal cement mixes, one a dispersed cement mix containing 3.2 sacks cement per cu. yd., the other an undispersed mix with 0.8 sacks additional cement. Excess cement has the undesirable effect of increasing heat evolution and temperature rise.

By taking full practical advantage of the potential value of cement, the dispersing action of Pozzolith makes concrete mixes of low cement content readily placeable. It diminishes the heat evolution by making excess cement unnecessary and thereby reduces volume change, checks cracking, and so produces more durable,* water-tight** concrete.

*See Freezing and Thawing and Corrosion Tests, Page 21, which show Pozzolith concrete is more resistant than plain concrete containing excess cement and water.

**See Rush Laboratory Report Page 11, which shows a 5-sack Pozzolith concrete to be more water-tight than the plain concrete containing excess cement and water.

and POZZOLITH REDUCES INITIAL COSTS—See page 18

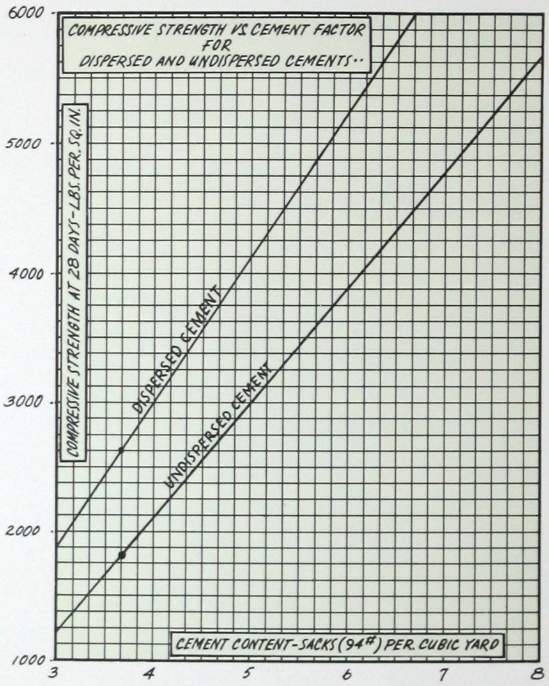
Pozzolith Reduces Initial Costs—Materials

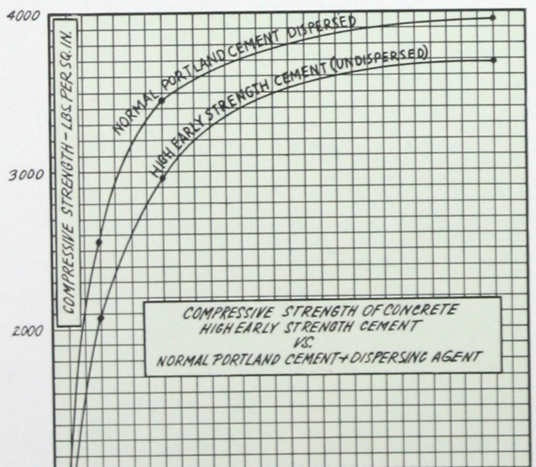
By Increasing Strength 25%
By Avoiding Excess Cement Content

STRENGTH—Dispersion will produce at any age strength equal to or greater than that obtained through the addition to the mix of one extra sack of cement in the usual mixes.

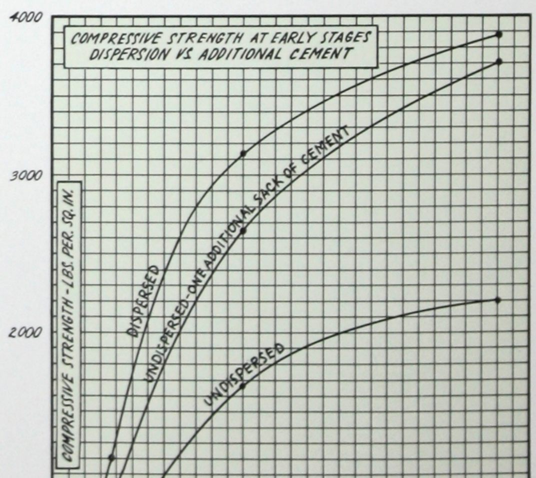
Since the cost of using dispersion is less than that of using one additional sack of cement, for a concrete mix of given strength, the most economical mix design will be secured by designing the mix with Pozzolith.

High Early Strength—High Early Pozzolith with normal portland cement will give Early Strengths comparable to those secured by using high early strength cements and greater than by using one additional sack of normal cement, and hence will substantially lower cost of materials.





High early strengths save in speed of construction, re-use of forms, reduced cost of curing, and earlier occupancy of the structure.



Pozzolith Reduces Initial Costs—Placing

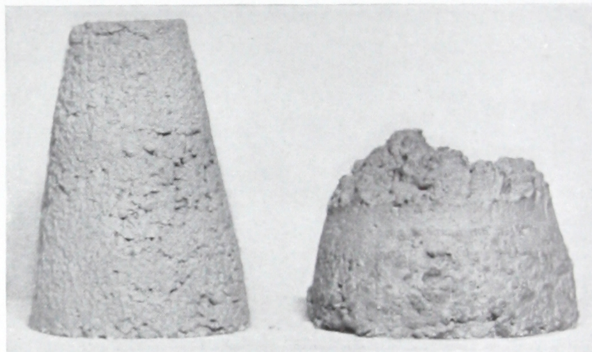
By Increasing Workability 150%
By Reducing Segregation

WORKABILITY—Dispersion will under normal conditions produce greater workability than one additional sack of cement with respect to both mobility and cohesiveness.

PITTSBURGH TESTING LABORATORY
PITTSBURGH, PENNA.
Nos. 3656 & 3685 - 5-3-38

	Undispersed	Dispersed
Cement	564 lbs.	470 lbs.
Fine Aggregate	1550 lbs.	1730 lbs.
Coarse Aggregate	2040 lbs.	2040 lbs.
Water	34 gal.	28 gal.
Slump	4¾"	4½"
28 days	4086 lbs.	4078 lbs.

POZZOLITH PRODUCES MORE COHESIVE CONCRETE WITH LESS WATER THAN ONE ADDITIONAL SACK OF CEMENT.



POZZOLITH PRODUCES GREATER MOBILITY

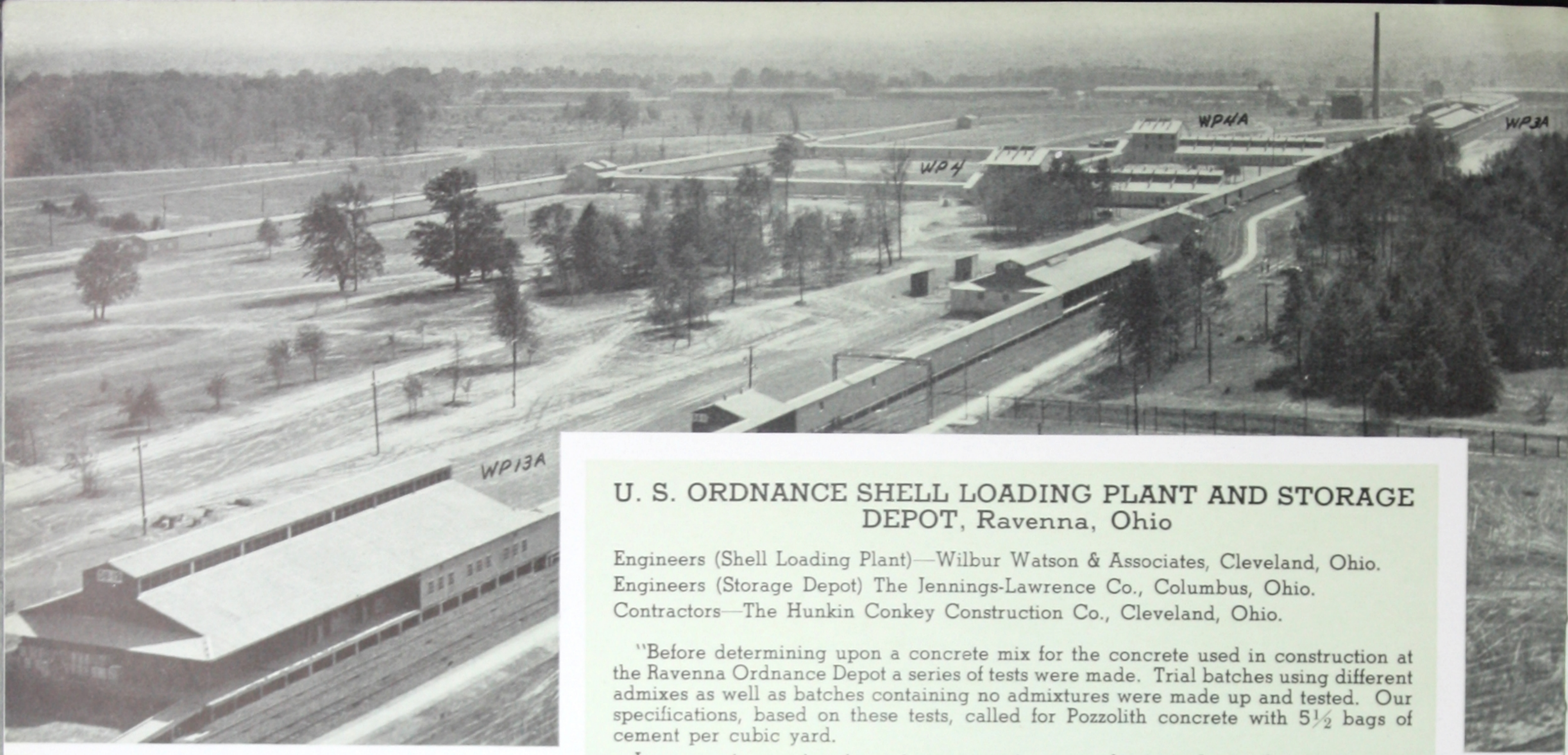
PLAIN MIX		POZZOLITH MIX
6½ gallons	W/C	6½ gallons
1 inch	SLUMP	5 inches

DISPERSION of the cement increases the mobility or fluidity of the concrete. When mobility is increased the concrete flows more readily and is compacted more easily. The concrete is, therefore, dumped from mixers, trucks, buggies, and moved into place with less labor. Less labor is required for compacting, filling in around reinforcing, and other operations involved in placing the concrete where it is wanted.

With a more workable concrete better surfaces next to forms are secured. Less rubbing and finishing are required to put these surfaces into good condition where appearance is a factor.

Dispersion improves the cohesiveness of the mix so that there is less tendency toward segregation, honeycombing, sand-streaking and similar defects due to segregation. The greater ease of placing and compacting also reduces the amount of similar defects due to failure to secure complete filling and compacting at all points. The reduction of these defects reduces the labor required for patching, repair and finishing.

In short, dispersion of the cement in a concrete mix permits savings to be made in the initial cost of the concrete in place by reducing the labor of placing and finishing. These reductions in labor costs are secured without increase in materials costs—in practically all cases, at lower materials costs. In certain types of work where labor costs are more important than material costs, large economies in labor can be made by using Cement Dispersion at small added material cost—giving a substantial net saving.



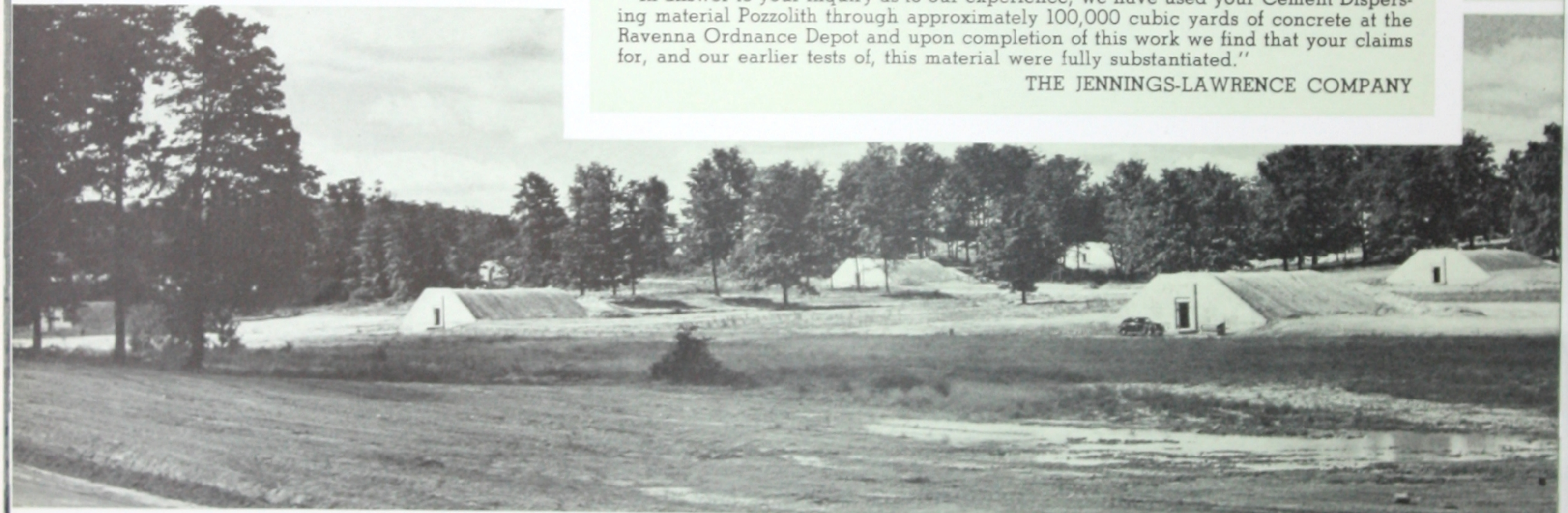
U. S. ORDNANCE SHELL LOADING PLANT AND STORAGE DEPOT, Ravenna, Ohio

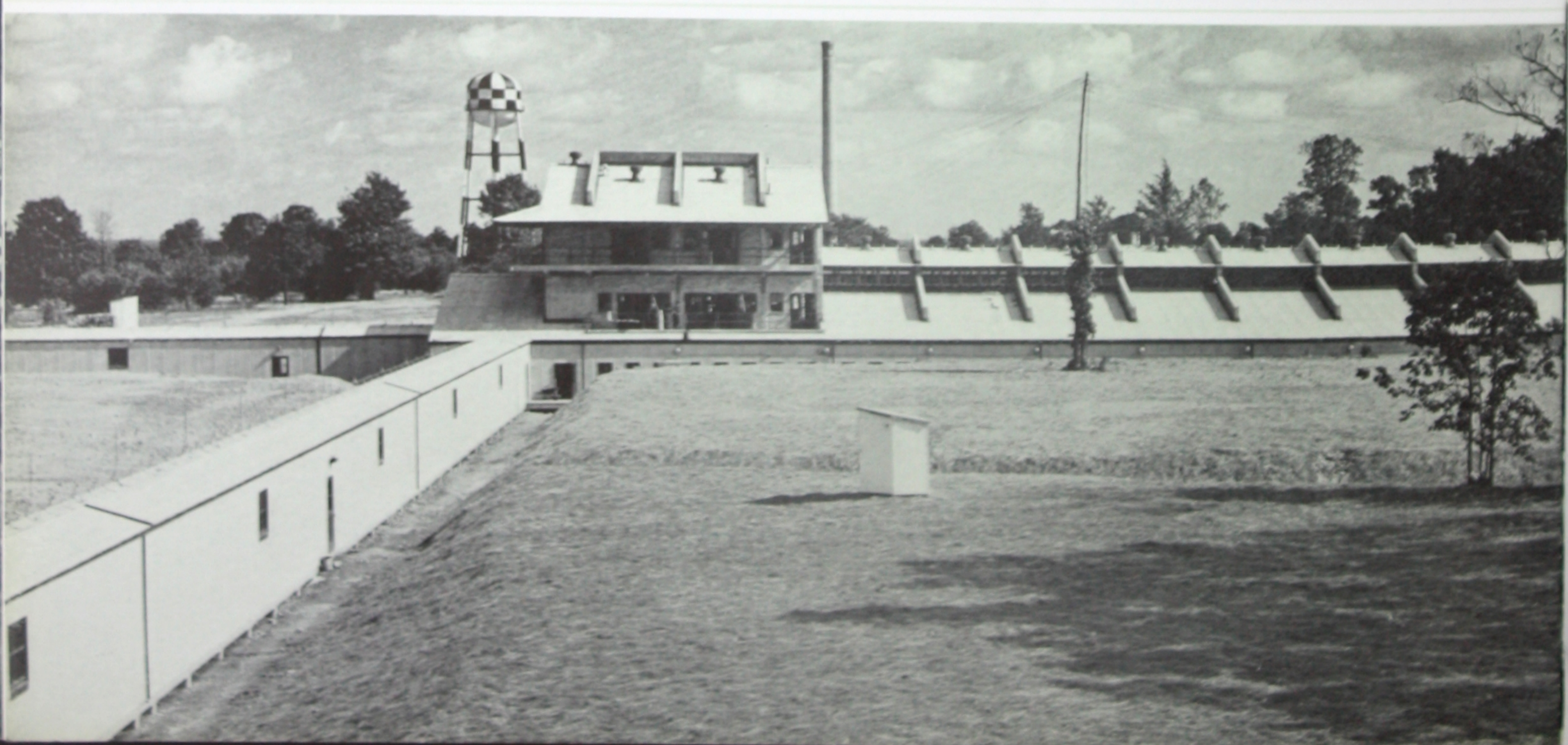
Engineers (Shell Loading Plant)—Wilbur Watson & Associates, Cleveland, Ohio.
Engineers (Storage Depot) The Jennings-Lawrence Co., Columbus, Ohio.
Contractors—The Hunkin Conkey Construction Co., Cleveland, Ohio.

"Before determining upon a concrete mix for the concrete used in construction at the Ravenna Ordnance Depot a series of tests were made. Trial batches using different admixes as well as batches containing no admixtures were made up and tested. Our specifications, based on these tests, called for Pozzolith concrete with 5½ bags of cement per cubic yard.

In answer to your inquiry as to our experience, we have used your Cement Dispersing material Pozzolith through approximately 100,000 cubic yards of concrete at the Ravenna Ordnance Depot and upon completion of this work we find that your claims for, and our earlier tests of, this material were fully substantiated."

THE JENNINGS-LAWRENCE COMPANY

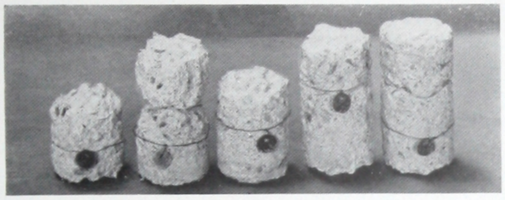




Pozzolith Reduces Maintenance Costs
By Increasing Resistance to Freezing and Thawing and Corrosion

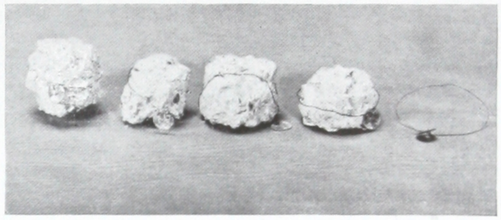
DURABILITY

POZZOLITH



Specimens of Pozzolith concrete, made with 20% more aggregate than the plain concrete at right, but at the same consistency, after the same 150 freezing and thawing cycles. *Loss in weight 34%.*

PLAIN



The plain concrete specimens after 150 freezing and thawing cycles. Disintegration far advanced. *Loss in weigh 73%.*

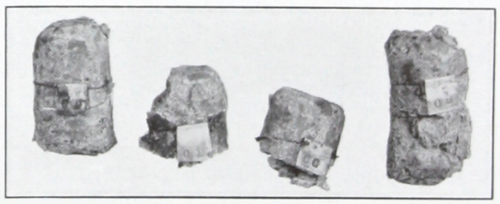
a. Resistance to freezing and thawing—Dispersion produces markedly higher resistance than one additional sack of cement.

CORROSION

POZZOLITH

DISPERSED CONCRETE

PLAIN

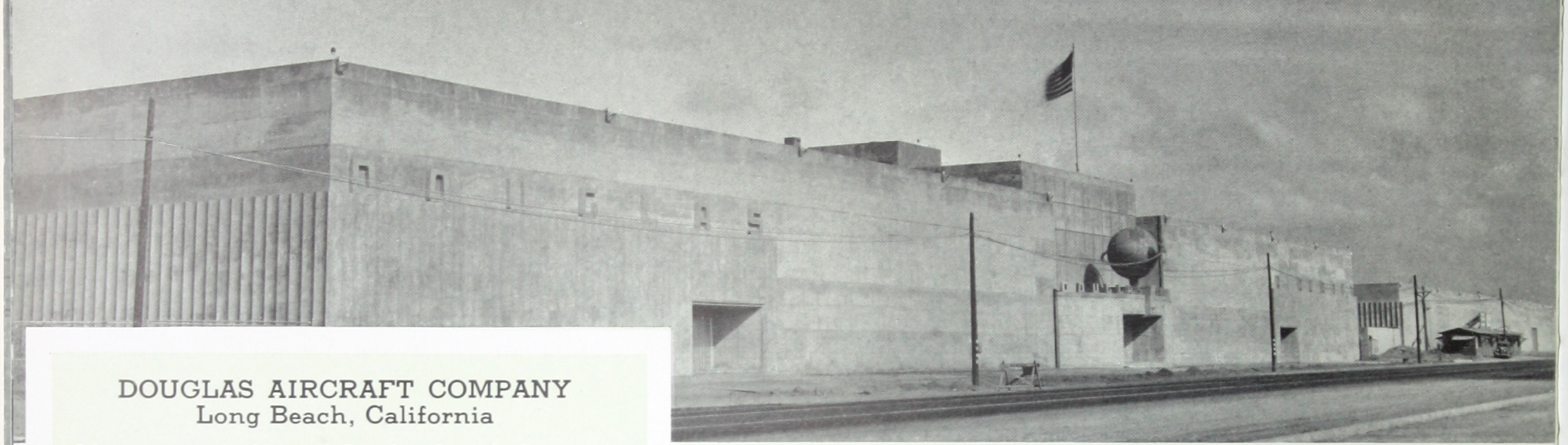


UNDISPERSED CONCRETE
1½ Sacks Additional Cement

AFTER 2 YEARS IN 8% MAGNESIUM SULPHATE

b. Resistance to corrosion—Dispersion produces markedly higher resistance to sulphate waters than one additional sack of cement.

Dispersion greatly enhances the durability of the concrete mix at no additional material cost. With increased durability there can be little question that under any given conditions the cost of maintenance will be materially decreased and the serviceable life of the structure, before replacement is required, will be substantially prolonged.



DOUGLAS AIRCRAFT COMPANY
Long Beach, California

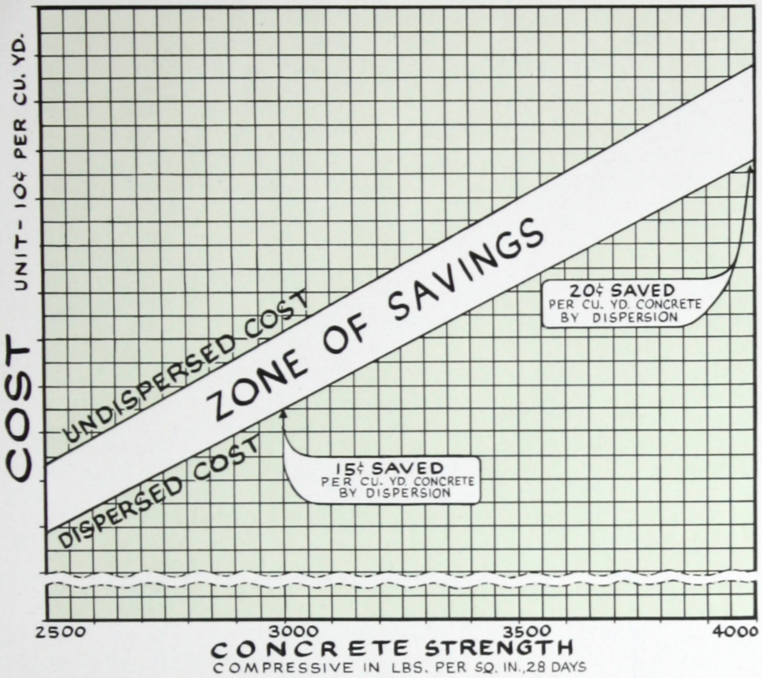
Administration building of Douglas Aircraft Company's huge new "blackout" plant is the first windowless office building erected west of the Mississippi, and one of the largest such structures in the U. S. A.

Pozzolith used in walls and floors.

Architect—Ellis W. Taylor & Edward C. Taylor, Los Angeles, California.

Contractor—Walker Construction Company, Los Angeles, California.

Pozzolith Utilizes Dormant Cement



Based on cement at 50c per sack

To Create This Saving Zone

WHATEVER Your Concrete Requirements are—whether they be for low strength or high strength, for a 5-year shed or a 50-year dam—you produce them at *Lower First Cost* with concrete designed and built with *Pozzolith*. In addition, subsequent costs for *Maintenance* are lower.

Specify

"**All** concrete mixes *shall be designed* with *Pozzolith*" to assure getting the full increase in durability and the *full initial savings* produced by Cement Dispersion.

WHAT USERS SAY...

EAST CHICAGO, INDIANA WATERWORKS

". . . by using Pozzolith we were able to reduce the water content of the mixture by 20%, thereby effecting a **sufficient saving** on cement **to offset the cost of Pozzolith.** We also found easier placement of concrete, which meant a **saving in labor,** and finally, the concrete so placed was **very dense and water-tight.**"

H. B. OLNEY, INC., East Chicago, Indiana

VALDESE, NORTH CAROLINA
WATER PURIFICATION PLANT

". . . it was possible to reduce the water ratio approximately three quarts per batch . . . as well as **effecting a saving of approximately eight per cent** . . . The workability of the mixed concrete with Pozzolith, was far superior than had we used the required amount of cement and water."

BOYD & GOFORTH, INC., Charlotte, North Carolina

MISSOURI STATE PENITENTIARY,
JEFFERSON CITY, MISSOURI

"The concrete flowed perfectly, with a **minimum of placing labor** and gave a splendid appearing surface when the forms were removed."

GEO. E. McINTYRE, Jefferson City, Missouri

"Using the Pozzolith has also made a difference in keeping both pallets and block machine free of excess materials. That in itself is a **great saving in labor.**"

CRAWFORD BUILDERS SUPPLIES, Port Huron, Michigan

GARY, INDIANA SEWAGE TREATMENT PLANT

"The addition of **Pozzolith** increased the workability and plasticity of the concrete with no increase in the water cement ratio, **greatly facilitating the placing and finishing operations.**"

PERMANENT CONSTRUCTION CO., Chicago, Illinois

BANKERS LIFE BUILDING, DES MOINES, IOWA
UNITED BENEFIT LIFE INSURANCE BUILDING,
OMAHA, NEBRASKA

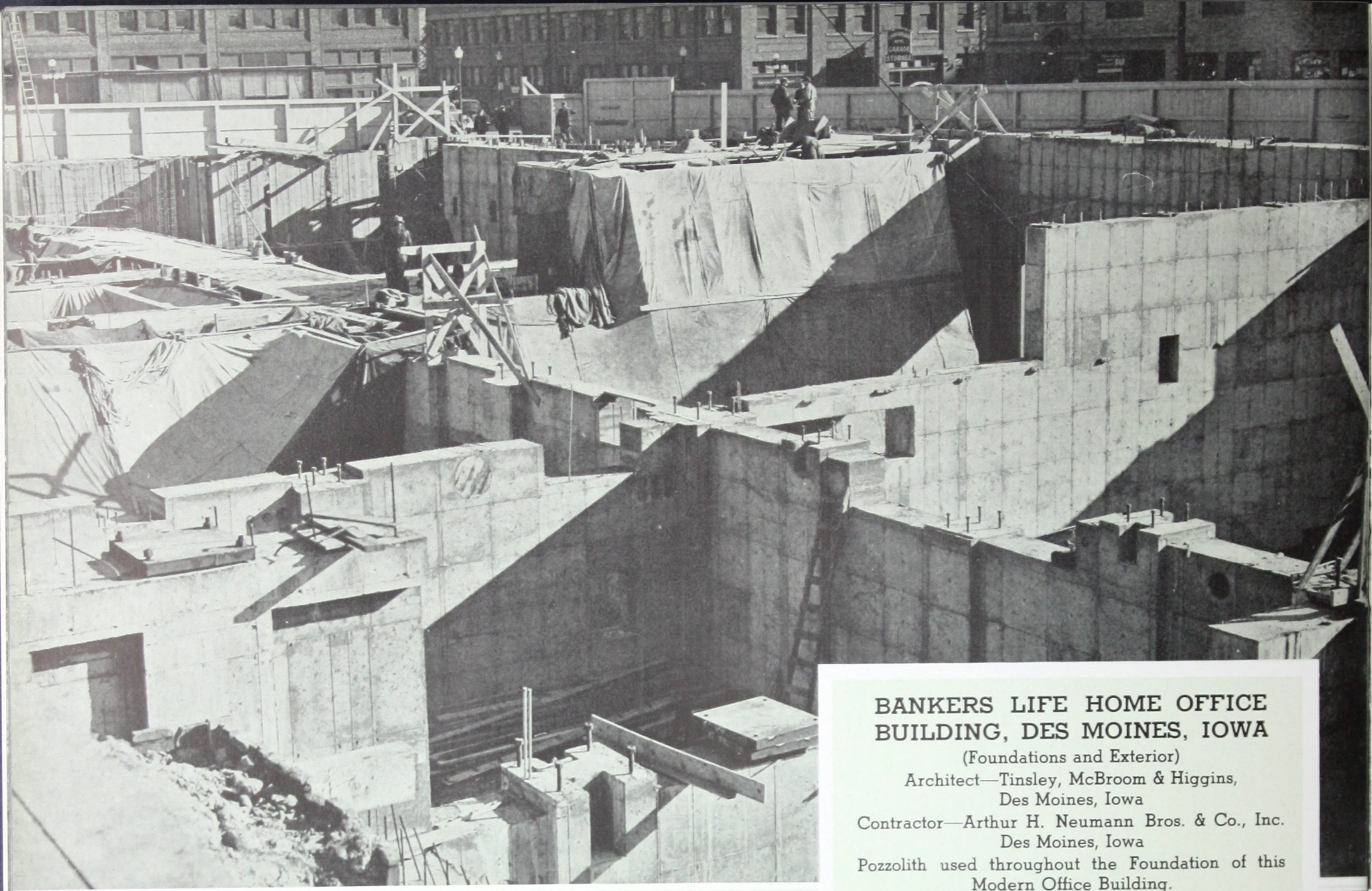
"**In addition to the permanent improvement in the quality of the concrete through the use of less water,** contractors advise us that they are able to place Pozzolith concrete more easily and obtain a better appearing job."

TINSLEY, McBROOM & HIGGINS, Des Moines, Iowa

KANSAS CITY, KANSAS LEVEE ELEVATOR

". . . The addition of Pozzolith has maintained the desired slump with a reduced amount of water and has given a concrete **easy to place with the minimum of labor.**"

HORNER & WYATT, Kansas City, Missouri



BANKERS LIFE HOME OFFICE BUILDING, DES MOINES, IOWA

(Foundations and Exterior)

Architect—Tinsley, McBroom & Higgins, Des Moines, Iowa

Contractor—Arthur H. Neumann Bros. & Co., Inc. Des Moines, Iowa

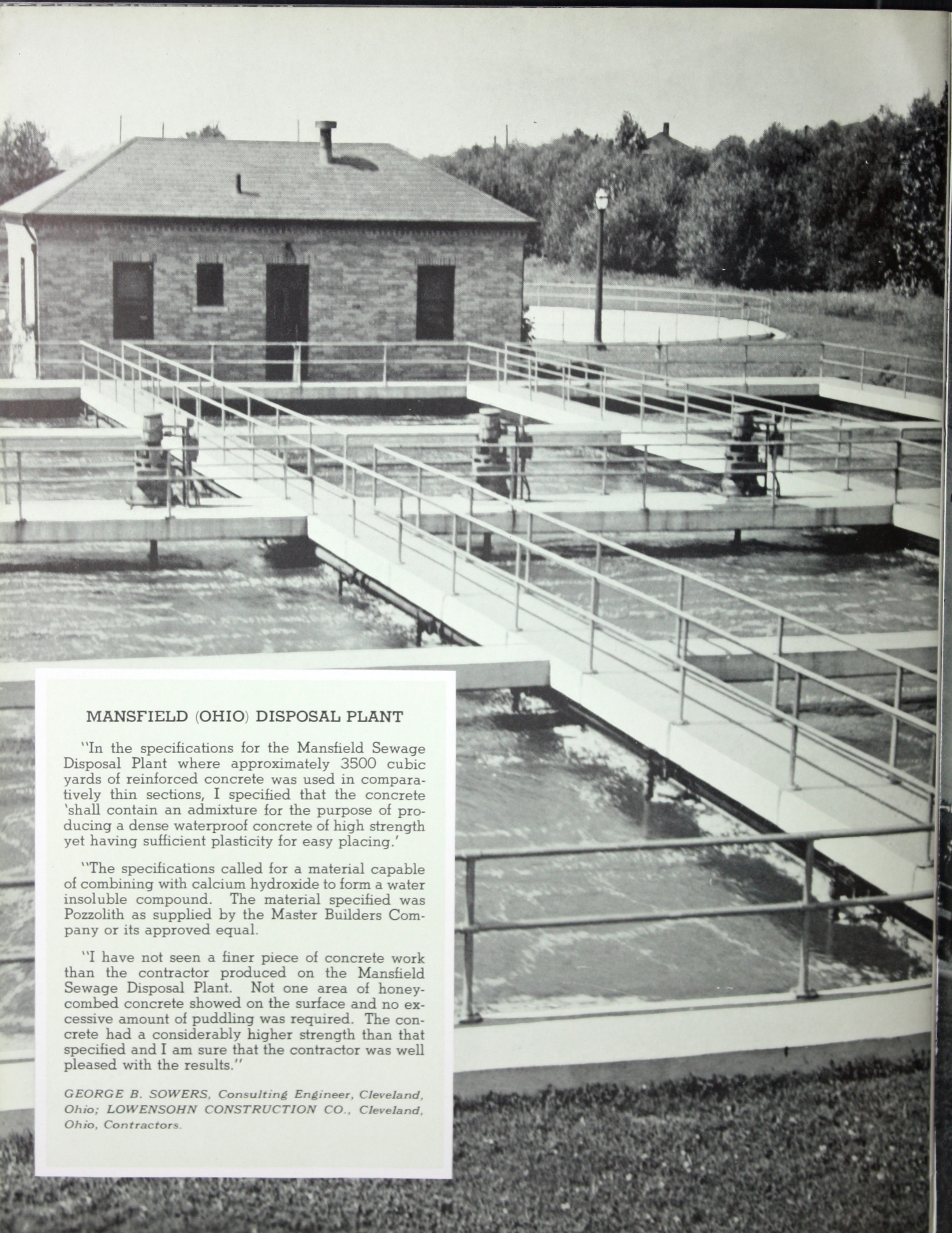
Pozzolith used throughout the Foundation of this Modern Office Building.

AQUATIC PARK CLUB HOUSE
San Francisco, California.

10,000 cu. yds. of Pozzolith Concrete used.
Architect—William Mooser, San Francisco, California.
Supt. of Construction—Leroy B. Frazier, San Francisco, California.

CLARK COUNTY COURT HOUSE
Vancouver, Washington

Pozzolith used throughout all architectural concrete.
Architect—Day W. Hilborn, Vancouver, Washington.
Architectural Sculptor—Victor Snyder.
General Contractor—Ross B. Hammond Co., Portland, Ore.



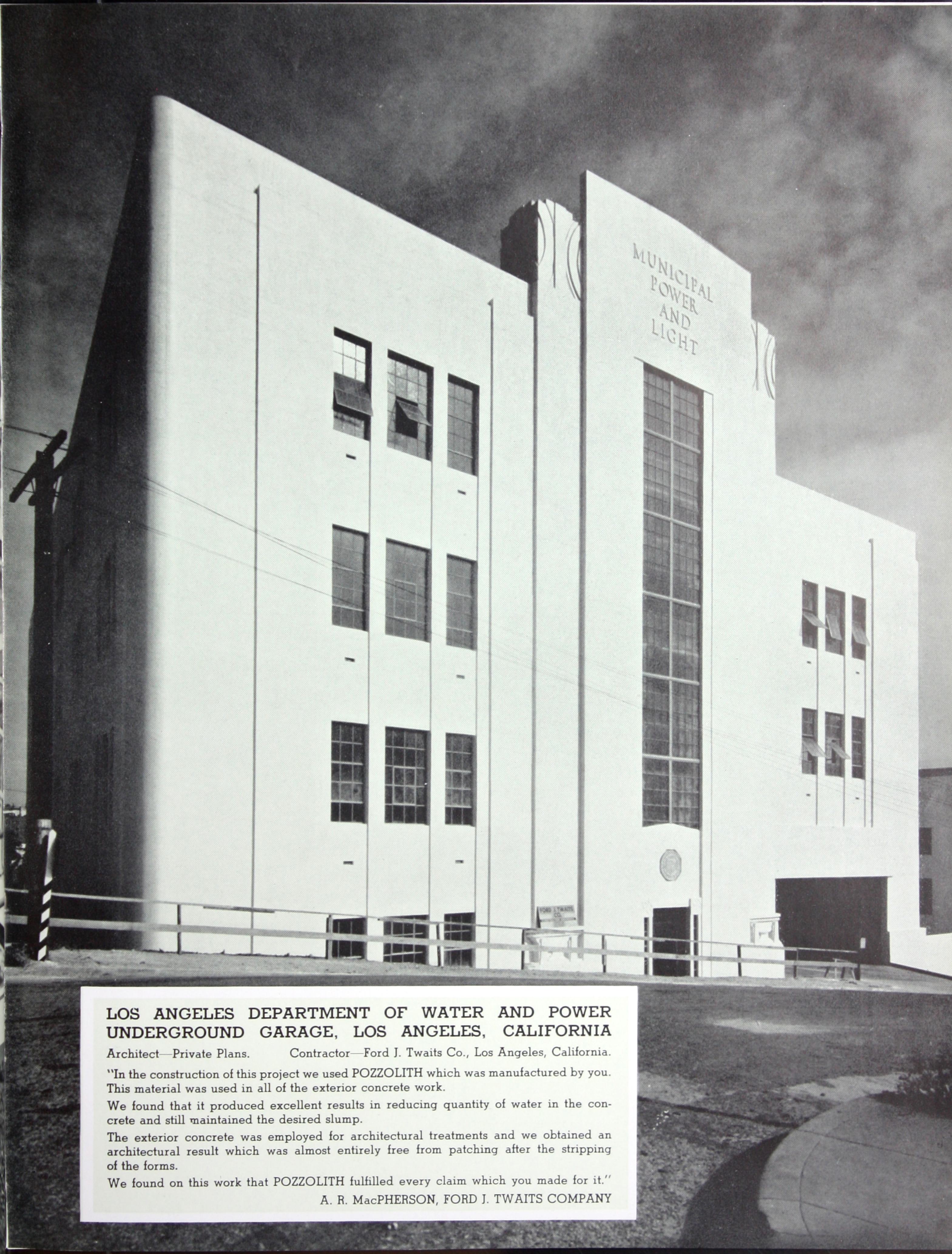
MANSFIELD (OHIO) DISPOSAL PLANT

"In the specifications for the Mansfield Sewage Disposal Plant where approximately 3500 cubic yards of reinforced concrete was used in comparatively thin sections, I specified that the concrete 'shall contain an admixture for the purpose of producing a dense waterproof concrete of high strength yet having sufficient plasticity for easy placing.'

"The specifications called for a material capable of combining with calcium hydroxide to form a water insoluble compound. The material specified was Pozzolith as supplied by the Master Builders Company or its approved equal.

"I have not seen a finer piece of concrete work than the contractor produced on the Mansfield Sewage Disposal Plant. Not one area of honeycombed concrete showed on the surface and no excessive amount of puddling was required. The concrete had a considerably higher strength than that specified and I am sure that the contractor was well pleased with the results."

GEORGE B. SOWERS, Consulting Engineer, Cleveland, Ohio; LOWENSOHN CONSTRUCTION CO., Cleveland, Ohio, Contractors.



LOS ANGELES DEPARTMENT OF WATER AND POWER UNDERGROUND GARAGE, LOS ANGELES, CALIFORNIA

Architect—Private Plans. Contractor—Ford J. Twaits Co., Los Angeles, California.

"In the construction of this project we used POZZOLITH which was manufactured by you. This material was used in all of the exterior concrete work.

We found that it produced excellent results in reducing quantity of water in the concrete and still maintained the desired slump.

The exterior concrete was employed for architectural treatments and we obtained an architectural result which was almost entirely free from patching after the stripping of the forms.

We found on this work that POZZOLITH fulfilled every claim which you made for it."

A. R. MacPHERSON, FORD J. TWAITS COMPANY

ALLENTOWN RESERVOIR

Morris Knowles, Inc., Pittsburgh, Pa., engineers, specified and used Pozzolith in approximately 25,000 cubic yards of concrete to ". . . materially decrease the volume of water required to produce a placeable concrete." M. A. Long Co., Allentown, Pa., were contractors on this project.

(Top) **Bridge Of The Erie Railroad, Buffalo, N. Y.**

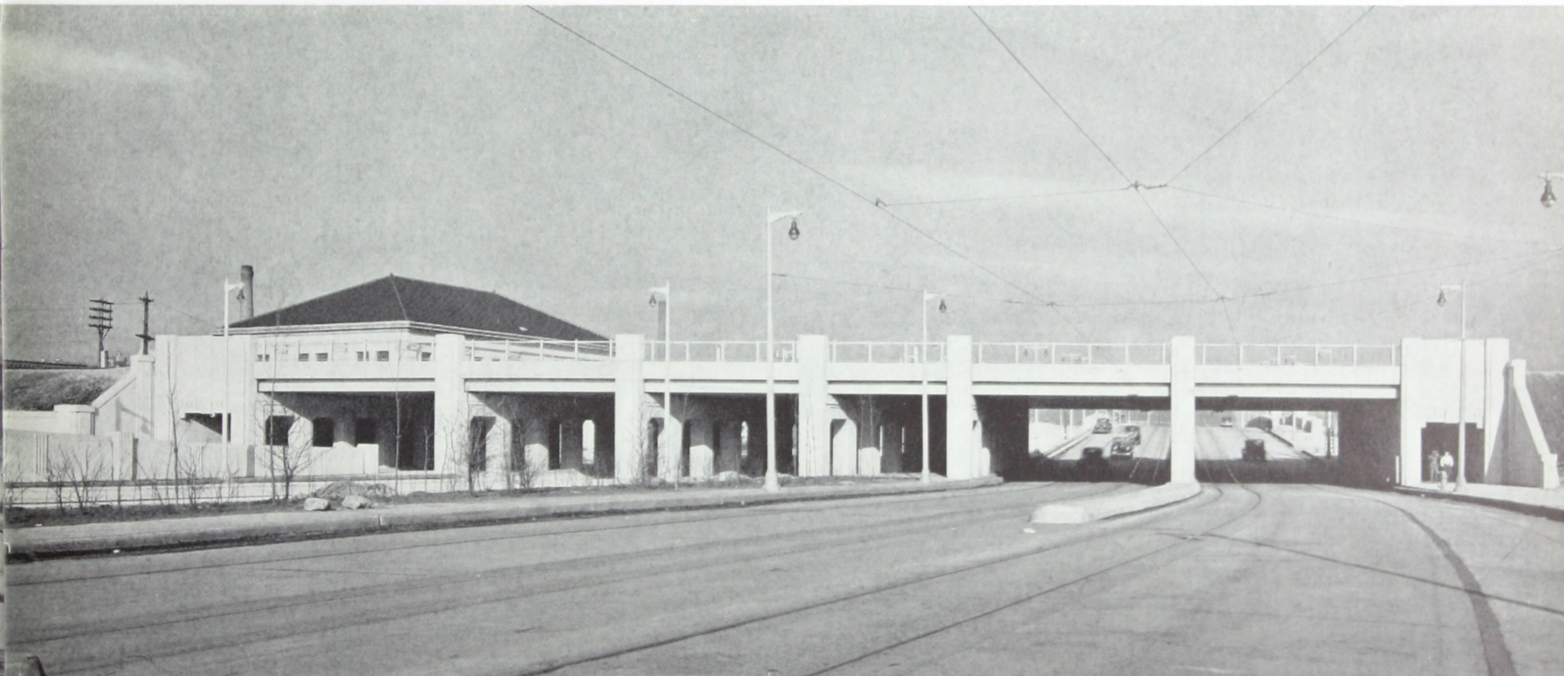
3,380 cubic yards of Pozzolith Concrete used.
Private Plans. Contractors—Freeman & Jones, Cleveland, Ohio.
This is one of nine Erie Bridges with Pozzolith Concrete.

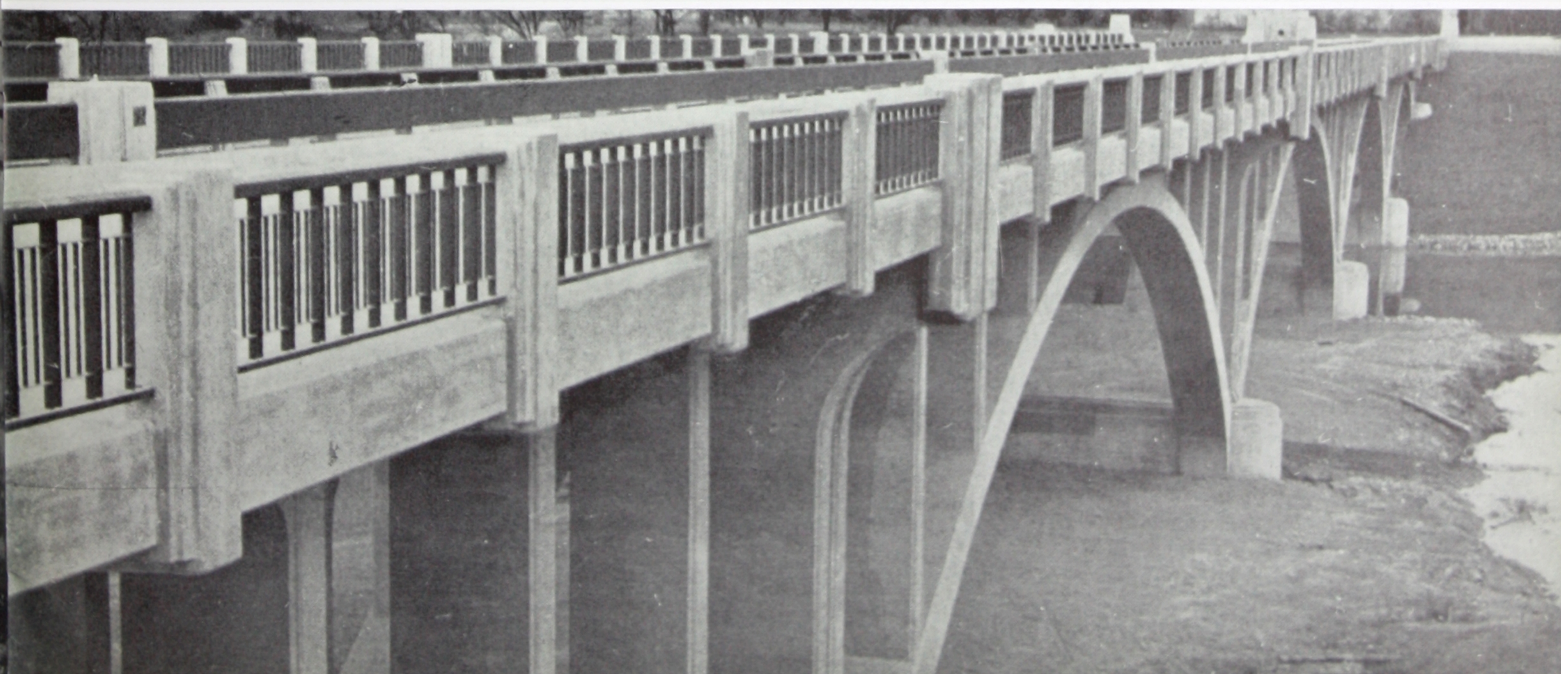
(Center) **Atchison, Topeka & Santa Fe Railroad Bridge Chicago, Illinois**

4,150 cubic yards of Pozzolith Concrete used.
Private Plans. Contractors—Great Lakes Dredge & Dock Company Chicago, Illinois
One of four projects with Pozzolith Concrete.

(Bottom) **Henley Bridge, St. Catherines, Ontario**

4,800 cubic yards of Pozzolith Concrete used.
Div. Engineer—C. F. Hanning, Grimsby, Ont.
Builders—Goldie Construction Co., St. Catherines, Ont.





REPRESENTATIVE LIST OF

COMMERCIAL

BANKS AND OFFICES

United Benefit Insurance Bldg., Omaha, Neb.
Archt.—Tinsley, McBroom & Higgins, Des Moines, Iowa
Contr.—Peter Kiewits Sons Co., Omaha, Nebr.

United National Bank of Long Island, Richmond Hill, L. I., New York.
Archt.—Koch & Wagner, Brooklyn, N. Y.
Contr.—Theo. L. Rubsamen, Jamaica, L. I., N. Y.

Federal Reserve Bank, Dallas, Texas.
Archt.—Gill & Bennett, Dallas, Texas.
Contr.—Henger Const. Co., Dallas, Texas.

CHAIN STORES

W. T. Grant Co., New London, Conn.; Paterson, N. J.; York, Pa.

Montgomery Ward Co., San Rafael, Calif.; Middletown, Conn.; La Grange, Ill.; Baltimore, Md.; Detroit, Mich.; Albuquerque, N. M.; Binghamton, N. Y.; Eugene, Ore.; Berkeley, W. Va.; Parkersburg, W. Va.

F. W. Woolworth Co., Rockville, Conn.; Springfield, Mass.; Albany, N. Y.; Sayre, Pa.

GARAGES

Heidelberg Garage, Jackson, Miss.
Archt.—R. W. Naef, Jackson, Miss.
Contr.—M. T. Reed Const. Co., Belzoni, Miss.

International Motor Truck Co., New York City.
Contr.—Turner Constr. Co., New York City.

Thrift Park Garage, Philadelphia, Pa.
Archt.—Silverman & Levy, Philadelphia, Pa.
Contr.—S. H. Levin, Philadelphia, Pa.

Greyhound Bus Lines Garage, Pittsburgh, Pa.
Archt.—Roldon F. Dressler, Chicago, Ill.
Contr.—Navarro Corp., Pittsburgh, Pa.

GRAIN ELEVATORS

Public Terminal Elevator Co., Wichita, Kans.
Archt. & Contr.—Chalmers & Borton, Hutchinson, Kans.

Froedtert Malting Co., Milwaukee, Wisc.
Archt.—Private Plans.
Contr.—Burrell Engrg. & Constr. Co., Chicago Ill.

TELEPHONE COMPANIES

S. W. Bell Telephone Company, Jonesboro, Ark.; Kansas City, Kans.; Wichita, Kans.; Kirkwood, Mo.; St. Louis, Mo.; Springfield, Mo.; Beaumont, Tex.; Pecos, Tex.

Southern Bell Telephone Company, Coral Gables, Miami Beach and Miami, Fla.; Decatur, Ga.

WAREHOUSES AND STORAGE BUILDINGS

Vernon Hide Warehouse, Los Angeles, Calif.
Archt.—H. A. Hamm, Pasadena, Calif.
Contr.—S. J. Stokes, Los Angeles, Calif.

House of David Cold Storage Building, Benton Harbor, Mich.
Archt.—H. T. DeWhirst Secy. for Owner.
Contr.—Wm. Wright, Benton Harbor, Mich.

EDUCATIONAL

COLLEGES AND SCHOOLS

El Monte High School, El Monte, Calif.
Archt.—Marsh, Smith & Powell, Los Angeles, Calif.
Contr.—Steed Bros., Alhambra, Calif.

Biscayne Elementary School, Miami, Fla.
Archt.—August Geiger, Miami Beach, Fla.
Contr.—Halsema Bros., Miami, Fla.

Wabash College, Crawfordsville, Ind.
Archt.—J. F. Larson, Hanover, N. H.
Contr.—Leslie Colvin, Indianapolis, Ind.

Sumner High School, Kansas City, Kans.
Archt.—J. W. Radotinsky, Kansas City, Kans.
Contr.—Patti Constr. Co., Kansas City, Kans.

Colby College, Waterville, Maine.
Archt.—J. F. Larson, Hanover, N. H.
Contr.—Hegeman-Harris Co. Inc., New York City.

Mississippi Southern College, Hattiesburg, Miss.
Archt.—Shaw & Woleben, Gulfport, Miss.
Contr.—B. L. Knost, Pass Christian, Miss.

Dartmouth College, Hanover, N. H.
Archt.—J. F. Larson, Hanover, N. H.
Contr.—H. P. Cummings Constr. Co., Ware, Mass.

South High School Stadium, Columbus, Ohio.
Archt.—Edw. Kromer, Columbus, Ohio.
Contr.—W. P. A.

A. & M. College, Stillwater, Okla.
Archt.—P. A. Wilber, Stillwater, Okla.
Contr.—Chas. M. Dunning Constr. Co., Oklahoma City, Okla.

St. Mary's Academy, Portland, Ore.
Archt.—F. B. Jacobberger, Portland, Ore.
Contr.—Robertson, Hay & Wallace, Portland, Ore.

Wm. & Mary College, Norfolk, Va.
Archt.—C. A. Neff, Norfolk, Va.
Contr.—W. P. A.

Central Collegiate Gymnasium, Calgary, Alberta
Archt.—W. A. Brandon, Calgary, Alberta.
Contr.—Bennett & White Constr. Co., Calgary, Alberta.

McGill University, Montreal, Quebec.
Archt.—McDougall & Friedman, Montreal, Quebec.
Contr.—E. G. M. Cape & Co., Montreal, Quebec.

LIBRARIES

Teachers College & Practice School Library Statesboro, Ga.
Archt.—Tucker & Howell, Atlanta, Ga. and Robert S. Fiske, Atlanta, Ga.
Contr.—W. H. Aldred, Jr., Statesboro, Ga.

Villa Scholastica School Library and Chapel, Duluth, Minn.

INDUSTRIAL

AIRCRAFT

Douglas Aircraft Co., El Segundo, Long Beach and Santa Monica, Calif.
Archt.—Ellis W. Taylor & Edward C. Taylor, Los Angeles, Calif.
Contr.—Atlas Constr. Co., Pasadena, Calif. and Walker Constr. Co., Los Angeles, Calif.

McClellan Field, Engine Test Bldg., Sacramento, California.
Archt.—Private Plans—Sacramento, California.
Contr.—Ford J. Twaits Co., Los Angeles, Calif.

Consolidated Aircraft Co., San Diego, Calif.
Archt.—Ellis W. Taylor & Edward C. Taylor, Los Angeles, Calif.
Contr.—B. O. Larson, San Diego, Calif.

Stearman Hammond Aircraft Corp., So. San Francisco, Calif.
Archt.—Private Plans.
Contr.—A. P. Fisher, San Francisco, Calif.

Grumann Aircraft Corp., Farmingdale, New York.
Engrs. & Contrs.—The Austin Co., N. Y. C.

Taylorcraft Aviation Co., Alliance, Ohio.
Archt.—Albert Kahn, Inc., Detroit, Mich.
Contr.—E. H. Martin Constr. Co., Detroit, Mich.

Aero Products Co., Vandalia, Ohio.
Archt.—Private Plans, Dayton, Ohio.
Contr.—Frank Messer & Sons, Cincinnati, Ohio

Warminster Aircraft Corp., Hatboro, Pa.
Archt.—Silverman & Levy, Philadelphia, Pa.
Contr.—Geo. A. Fuller Co., Philadelphia, Pa.

Lycoming Aviation Corp., Williamsport, Pa.
Archt.—John Boden, Williamsport, Pa.
Contr.—Jacob Gehron Co., Williamsport, Pa.

AUTOMOTIVE

Ford Motor Co., Dearborn, Detroit, Milford and Northville, Mich.

Packard Motor Co., Detroit, Mich.
Archt.—Private Plans, Mr. Gustavis, Detroit, Mich.
Contr.—W. J. C. Kaufman, Detroit, Mich.

Buick Motor Co., Flint, Mich.
Archt.—Private Plans.
Contr.—J. A. Utley Co., Royal Oak, Mich.

Chevrolet Motor Co., Flint, Mich.
Archt.—Private Plans.
Contr.—Perry Root Co., Flint, Mich.

White Motor Co., Cleveland, Ohio.
Archt.—Private Plans.
Contr.—The Brown Const. Co., Cleveland, Ohio.

BEVERAGES

Pepsi-Cola Co., Miami, Fla.
Archt.—W. T. Eefting.
Contr.—Witters Constr. Co., Miami, Fla.

Coca Cola Bottling Co., Baltimore, Md.; Fergus Falls, Minn.; Atlantic City, N. J.; Syracuse, N. Y.; Pittsburgh, Pa.; Providence, R. I.

Anheuser Busch Brewery Beer Storage Tanks, St. Louis, Mo.
Gen. Contr.—Bosari Tank Corp., New York City.
Concrete Contr.—Millstone Constr. Co., St. Louis, Mo.

CHEMICALS

E. I. duPont de Nemours & Co., Inc., So. San Francisco, Calif.; Wilmington, Del.; Clinton, Iowa; White Plains, Md.; Carney's Point, N. J.; Niagara Falls, N. Y.; Philadelphia, Pa.; Martinsville, Va.; Belle, W. Va.

Monsanto Chemical Co., New Resinox Bldg., Springfield, Mass.
Archt.—J. R. Worcester Co., Boston, Mass.
Contr.—J. G. Roy & Sons Co., Springfield, Mass.

Grasselli Chemical Co., Cleveland, Ohio.
Contr.—The Hunkin Conkey Constr. Co., Cleveland, Ohio.

DEFENSE PROJECTS

Reynolds Metals, Inc., Sheffield, Ala.
Engrs.—United Engrg. & Fdry. Co. Pitts., Pa.
Contrs.—F. H. McGraw Co., New York City

Remington Arms Plant, Denver, Colorado.
Archt.—Smith, Hinchman & Grylls, Detroit, Mich.
Contr.—Broderick & Gordon Constr. Co., Denver, Colo.

Elwood Ordnance Depot, Joliet, Illinois.
Engrs. & Contrs.—Sanderson & Porter, Joliet, Ill.

Rock Island Arsenal, Administration Bldg., Rock Island, Illinois.
Archt.—Private Plans.
Contr.—Priester Construction Co., Davenport, Iowa.

Iowa Ordnance Depot, Burlington, Iowa.
Engrs.—Day & Zimmerman, Philadelphia, Pa.
Contrs.—Guthrie & Johnson, Burlington, Iowa.

Todd Shipyards, South Portland, Maine.
Engrs.—Chas. T. Main, Inc., Boston, Mass.
Contrs.—Sanders Engrg. Co., Portland, Maine.

U. S. Coast Guard Ordnance Building, Curtis Bay, Md.
Archt.—U. S. Treasury Dept.
Contr.—C. W. Schmidt, Baltimore, Md.

U. S. Army Cantonment—Camp Edwards, Falmouth, Mass.; Camp Wallace, Hitchock, Tex.

Twin City Small Arms Plant, St. Paul, Minnesota.
Archt.—Smith, Hinchman & Grylls, Detroit, Michigan.
Contr.—Foley Bros. and Walbridge Aldinger & Co., St. Paul, Minn.

Remington Arms Plant, Lake City, Missouri.
Archt.—Smith, Hinchman & Grylls, Detroit, Mich.
Contr.—Walbridge Aldinger Co., Detroit, Mich. & Foley Bros. Inc., St. Paul, Minn.

Western Cartridge Plant, St. Louis, Mo.
Archts.—Giffels & Vallet, Inc., Detroit, Mich.
Contrs.—Fruco Constr. Co., St. Louis, Mo.

Wingate Ordnance Depot, Ft. Wingate, N. Mex.
Engrs.—T. H. Buell & Prouty Bros., Denver, Colo.
Contrs. — Allison - Smith - Fellows - Armstrong, Ft. Wingate, N. Mex.

U. S. Army Cantonment, Fort Bragg, N. C.

North Carolina Shipbuilding Co., Wilmington, N. C.
Private Plans.
Contrs. — Loftis - Orrell - Underwood, Wilmington, N. C.

U. S. Ordnance Shell Loading Plant and Storage Depot, Ravenna, Ohio.

Engrs. (Shell Loading Plant)—Wilbur Watson & Associates, Cleveland, Ohio.

Engrs. (Storage Depot)—The Jennings-Lawrence Co., Columbus, Ohio.
Contrs.—The Hunkin Conkey Constr. Co., Cleveland, Ohio.

Wolf Creek Ordnance Depot, Milan, Tenn.
Engrs. & Contrs.—Ferguson-Oman Constr. Co., Milan, Tenn.

Ogden Ordnance Depot, Ogden, Utah.
Archt.—Private Plans.
Contr.—Olson Construction Co., Lincoln, Neb.

Orchard Beach Air Base, Port Orchard, Washington.
Engrs. & Contrs.—The Austin Co.,, Seattle, Washington.

Aluminum Corp. Ltd., Reduction Plant, Arvida, Quebec.
Private Plans.
Contrs.—The Foundation Company of Canada, Ltd., Montreal, Quebec.

GLASS

Hazel-Atlas Glass Co., Lancaster, New York.
Archt.—Laurence Meharg, Wheeling, W. Va.
Contr.—J. W. Cowper Co. Inc., Buffalo, N. Y.

Libbey-Owens-Ford Glass Co., Toledo, Ohio.
Archt.—Private Plans.
Contr.—A. Bentley & Sons Co., Toledo, Ohio.

Pittsburgh Plate Glass Co., Ford City and Pittsburgh, Pa.; Houston, Texas.

MACHINERY AND TOOL MANUFACTURERS

Bullard Machine Tool Co., Bridgeport, Conn.
Engr.—Alexander Crossett, New York City.
Contr.—Turner Constr. Co., New York City.

International Harvester Co., Rock Island, Ill.
Archt.—Private Plans—Bert Poster, Maint. Supt.

Doehler Die Casting Co., Batavia, N. Y.
Archt.—G. Morton Wolfe, Buffalo, N. Y.
Contr.—C. B. Vannier, Buffalo, N. Y.

Westinghouse Air Brake Co., Trestle Footings, Wilmerding, Pa.
Archt.—T. J. Hutton, Wilmerding, Pa.
Contr.—Owners—John Poole, In Charge.

Canadian Car & Foundry Co., Ltd., Montreal, Quebec.

MILK PRODUCTS

Isaly Dairy—Factory & Office, Youngstown, O.
Archt.—C. F. Owsley, Youngstown, Ohio.
Contr.—J. Lombard, Youngstown, O.

Green Dairy Co., York, Pa.
Archt.—Harry Lenker, York, Pa.
Contr.—Reindollar & Son, York, Pa.

NON FERROUS METALS

Aluminum Co. of America, Los Angeles, Calif. and Edgewater, N. J.

American Zinc Co., Monsanto, Ill.
Engr. & Contr.—United Engrs. & Constrs., Chicago, Ill.

Carborundum Co., Niagara Falls, N. Y.
Plans by Owners Forces.

Aluminum Co. of Canada, Arvida and Port Alfred, Quebec.

POZZOLITH

Types and Specifications

POZZOLITH is made in two types—Standard and High Early. High Early Pozzolith provides all the advantages of Standard Pozzolith, plus high early strengths; i.e., normal 3 day strength in 1 day, normal 7 day strength in 3 days, normal 28 day strength in 7 days.

Both types are produced in highly concentrated form, providing maximum dispersion and maximum economy.

•

STANDARD POZZOLITH

Concentrated

Used 1 lb. per Sack of Cement

"Cement Dispersion shall be employed in all concrete through the use of Standard Pozzolith, used in accordance with the directions of the manufacturers, The Master Builders Co."

•

HIGH EARLY POZZOLITH

Concentrated

Used $1\frac{1}{2}$ lbs. per Sack of Cement

"Cement Dispersion shall be employed in all concrete through the use of High Early Pozzolith, used in accordance with the directions of the manufacturers, The Master Builders Co."

MASTERBUILT CONCRETE

TRADE MARK

THE MASTER BUILDERS COMPANY

CLEVELAND, OHIO

Factories:
CLEVELAND
BUFFALO
TORONTO

In Canada: THE MASTER BUILDERS CO., LTD.
TORONTO, ONT.

Sales Offices
in All
Principal Cities

PRINTED IN U.S.A.